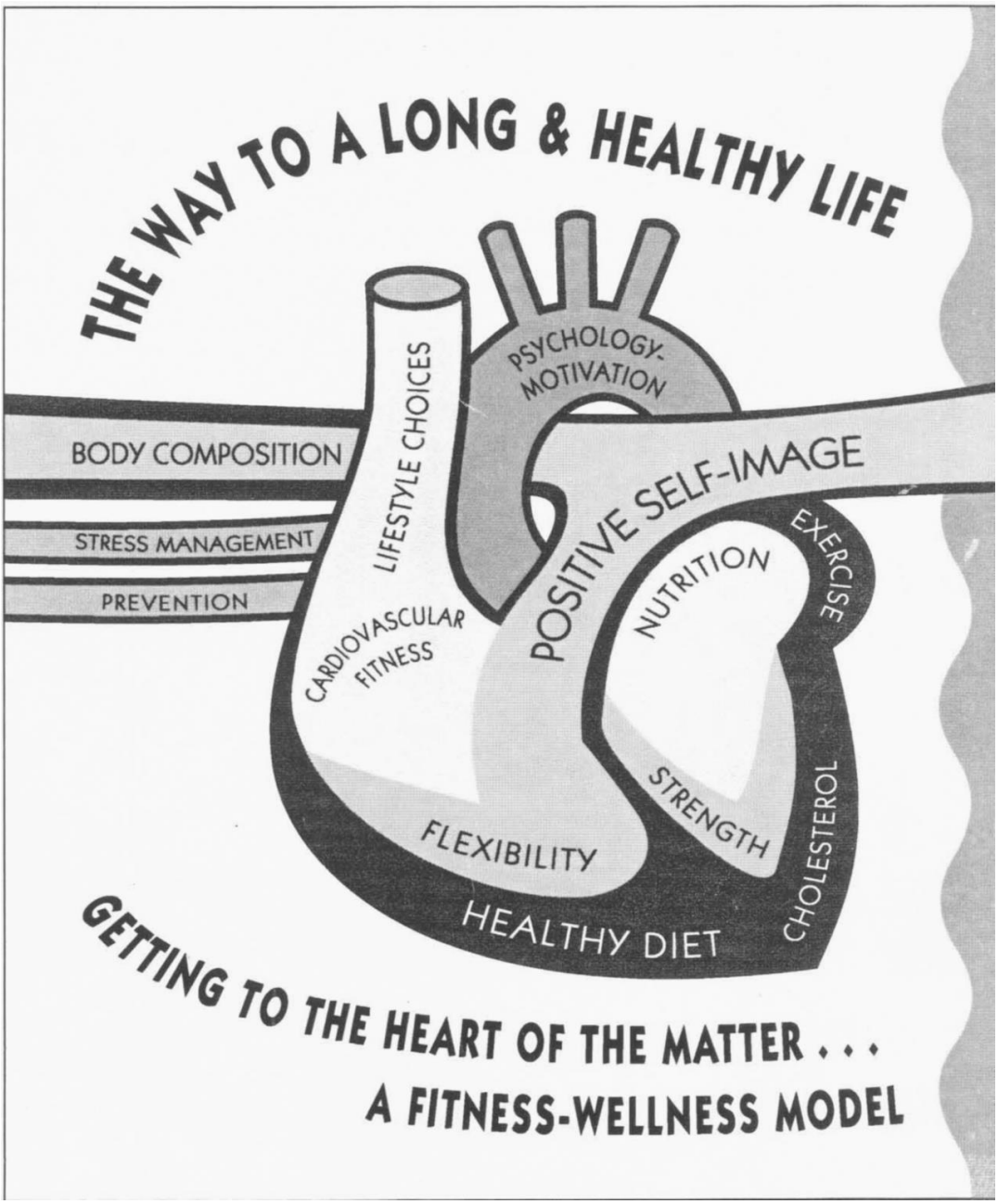
7th Edition-2015

Grossmont College

Exercise Science & Wellness Department



The Way to a Long & Healthy Life

Strategies for An Active & Healthy Life

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Inside this Booklet

Grossmont College is committed to promoting your personal fitness and wellness, and has developed this booklet to expose you to the key ingredients for healthful living. We hope that this knowledge will empower you to make decisions about your personal lifestyle practices to enhance wellness. The human body depends on many factors for optimum health, and the sooner you know about them, the sooner you can begin to lead an active and healthy life!

Imagine that someone gave you the car of your dreams, but under the condition that it would be the only automobile you could ever own! How would you take care of that car to ensure it lasted your entire life with as little damage as possible? You would most likely change the oil every 3,000 miles, choose the best gasoline, and learn everything you could about the care and maintenance of that car. If you did not do these things, you would likely spend a fortune on repairs and once it broke down, how would you travel? Your attitude toward the car-of-your-dreams is analogous to your body - you've only got one, and it, like the car scenario, has to last you a lifetime. Despite medical advances that can fix many things, repairs are not as effective when compared to preventing or reducing problems. Just as a magical pill won't fix your car, there is no magic pill for keeping the body healthy!

There are many factors to consider in the care and maintenance of the body, including physical fitness, exercise, nutrition, weight control, and heart disease prevention. Participating in sports and fitness activities can be fun, exciting, and challenging! We have designed classes to introduce students to additional concepts besides just sport skills, rules, strategies and theories. In all activity classes, students learn exercise training principles, strategies to prevent heart disease, concepts of weight control and nutrition. Knowing these basics will help to maximize fitness, health, and wellness!

ESW Department Offices & Classrooms

ESW Dept & Faculty Mailboxes: room 41-132

Faculty Offices: (East end) Refer to your course syllabus or class schedule for specific office numbers.

Fitness Room: 41-101

Weight Room: 41-100 (West end)

Locker Rooms: Located in the middle of the building. Bring your own lock and towel; showers and wall dryers are available. Lockers are to be used **only during your class period** and may NOT be kept for the entire semester. We have an extremely limited number of lockers available; any locks left on overnight will be cut off and the contents removed.

Athletic Training: 41-119 Provides services for intercollegiate student-athletes who require the attention of the athletic trainers, and is located on the north side of the building.

Athletic Director's Office: 41-124

Classrooms: 41-116 and 41-117

Building 42: "The Studio" exercise/dance classroom (42-101) and lower gymnasium (42-001); located southeast of Building 41.

Why is Physical Fitness Important?

We have all heard the phrase "*exercise is good for you",* but why is it important? Research has shown many benefits of an active lifestyle. Health professionals agree that if exercise were medicine, it would be the most universally prescribed medicine on the planet, used to both prevent and treat conditions such as: cardiovascular disease, coronary artery disease, obesity, diabetes, osteoporosis, hypertension, elevated cholesterol, and depression. In addition to preventing chronic disease, exercise improves mental fitness as well by decreasing stress, promoting self-esteem, improving concentration, memory, and overall academic achievement. Exercise also aids in weight control, joint flexibility, and maintains both cardiovascular and muscular strength. In short, exercise can help you to live longer and better!

What is Physical Fitness?

The term ***fitness*** is broadly used and often vaguely defined. Many people perceive health, wellness and fitness as one and the same, yet there is a definite distinction between the concepts. The term ***health*** is traditionally defined as 'absence of disease' and ***wellness*** refers to a person's overall state of being with respect to many dimensions including physical, mental, social, environment, occupational and emotional well-being. Many experts use health and wellness as interchangeable terms. ***Physical fitness*** refers specifically to the ability to perform physical activity or physical work without undue fatigue, and is a major factor in the physical component of health and wellness.

5 Components of Physical Fitness

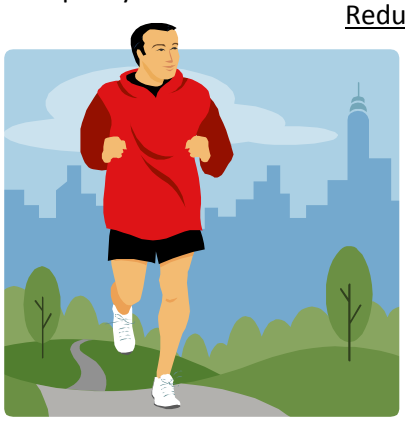
Physical fitness encompasses five basic components: ***1) muscular strength, 2) muscular endurance, 3) flexibility, 4) cardiorespiratory endurance, and 5) body composition***. A physically fit person maintains proficiency in all five of these areas, not just one or two. The individual who looks great in a bikini or the person able to run a marathon may not actually be physically fit in the true sense of the term, as they may have deficiencies in muscular strength, flexibility, or any of the other parameters.

Muscular Strength

Muscular strength (MS) is the amount of force that can be exerted by a muscle, or a group of muscles, in one single, maximal effort. For example, if you went into the weight room and decided to see how many pounds you could bench press, the absolute heaviest weight you could press successfully one time would indicate the strength of muscles responsible for that movement. Not everyone needs to have the muscular strength of a body builder to be considered adequately fit in this area. Having adequate muscular strength decreases the likelihood of injuries and also enhances activities of daily living.

Muscular Endurance

Muscular endurance (ME) reflects the capacity of a muscle or muscle group to contract repeatedly. Examples of this are obvious — distance running or jogging, bicycling, sit ups in an exercise class — all illustrate muscle endurance. Sometime professionals combine these two components into a single category of muscular strength and endurance (MSE).



Flexibility

Flexibility is defined as the range of motion in a joint of the body. Flexibility plays an important role in our health and well-being, whether or not a person is involved in a sports activity. Flexibility may reduce the possibility of injury during an activity. Another important aspect of flexibility is the fact that adequate flexibility enables the body to move with ease during every day, normal types of tasks. In addition, some research suggests that regular maintenance of joint flexibility might possibly reduce the severity of future joint problems such as arthritis or bursitis.

Two of the most common types of flexibility training are ***static*** and ***dynamic***. Static flexibility exercises involve moving a joint into an extended position and holding that position for a minimum of 15-30 seconds. Dynamic flexibility involves conscious, controlled movement through the joint's range of motion.

Muscles and tendons stretch most effectively when the temperature within the muscle is slightly higher than normal. This is where the term ***warm up*** comes from: before exercise, perform light movements that mimic the activity to be performed. Dynamic stretching should be done during the warm-up phase, whereas static stretching should be done after the body is thoroughly warm. Recent research indicates that pre-exercise static stretching is not likely to prevent injuries: performing static stretching at the end of a workout session will result in long-term flexibility.

Cardiorespiratory Endurance

Cardiorespiratory endurance (CRE) is the ability of the heart and blood vessels to deliver adequate amounts of oxygen to the body. Also referred to as cardiovascular or aerobic fitness, this component of fitness has received a great deal of attention, as research has found the following responses and benefits to occur with regular aerobic exercise:

Reduced risk of cardiovascular disease Occurs as a result of participating in regular aerobic exercise *(heart disease is the nation's number one killer!)* A regular exerciser is less likely to suffer a heart attack, and more likely to survive if one does occur.

Reduction of certain cancers - Primarily breast and colon cancer can be decreased with regular cardio exercise.

Reduced blood pressure - Occurs as the cardiovascular system improves, and blood pressure may not elevate as much during periods of psychological or physical stress.

Type 2 Diabetes can be prevented and managed - Result of aerobic exercise and a sensible, nutritious diet.

Reduced resting heart rate (RHR) - RHR represents the number of times the heart beats per minute while at rest. This reflects an improvement in the efficiency of the heart to circulate blood and deliver oxygen throughout the body.

Increased stroke volume (SV) – SV is the amount of blood the heart can expel with each beat, which is another indication that heart strength has improved.

Increased Tidal Volume (TV) - TV is the amount of air that passes in and out of the lungs in an ordinary breath, which indicates a more efficient lung function.

Increased Healthy Cholesterol - Regular aerobic exercise increases the levels of healthy cholesterol (HDL or High Density Lipoprotein) that helps reduce heart disease risk.

Reduced Excess Body Fat – Less body fat enables individuals to control body weight and helps prevent heart disease.

TABLE 1 - PERCENT BODY FAT CLASSIFICATION

	20-39 years	40-59 years	60-79 years
WOMEN	**Percent Body Fat (%)**		
Essential Fat[a]	8-12	8-12	8-12
Low/athletic [b]	13-20	13-22	13-23
Recommended	21-32	23-33	24-35
Overfat [c]	33-39	34-39	36-41
Obese [c]	≥ 39	≥ 40	≥ 42
MEN	**Percent Body Fat (%)**		
Essential Fat[a]	3-5	3-5	3-5
Low/athletic [b]	6-7	6-10	6-12
Recommended	8-19	11-21	13-24
Overfat [c]	20-24	22-27	25-29
Obese [c]	≥ 25	≥ 28	≥ 30

The cutoffs for recommended, overfat, and obese ranges in this table are based on a study that linked body mass index classifications for the NIH with predicted percent body fat (measured using dual energy X-ray absorptiometry.

a. Essential body fat is necessary for the basic functioning of the body
b. Percent body fat in the low/athletic range may be appropriate for some people as long as it is not the result of illness or disordered eating habits.
c. Health risks increase as percent body fat exceeds the recommended range.

(1) Fit & Well: Core Concepts & Labs in Physical Fitness and Wellness, 6th Edition. McGraw-Hill, 2005.

Body Composition

Body composition (BC) refers to the relationship between the amount of fat and the amount of lean tissue a body contains. Muscle, bone, and organs account for the ***lean body weight*** (also termed fat free mass) and the remaining weight is stored ***body fat*** (technically termed adipose tissue*)*. The relative percentage of lean body mass and fat is largely determined by heredity, level of activity, and gender (females are genetically programmed to have a higher percentage of fat than males). Because of these factors, using a weight scale to monitor body fat levels is not effective: the scale measures total body weight and not the amount of lean mass or body fat. For example, two individuals of the same age, same height and same weight of 140 pounds may actually be drastically different in bone structure, muscle mass, and activity level; one of the individuals may have a much lower percentage of body fat than the other.

Table 1 provides guidelines for recommended percent body fat. The type of lifestyle one maintains will help to dictate the appropriate percentage for that individual. A female gymnast, for instance, will find 15% body fat much more ideal for the demands of her activity. On the other hand, a woman who enjoys daily, moderate exercise will find a percent fat between 21-32% to be adequate. In short, there is not one ideal fat percentage for which everyone should strive. An excessive amount of body fat, however, is undesirable and can, in fact, be a health hazard.

BODY MASS INDEX

Body Mass Index (BMI) is used to assess weight relative to height in order to gauge the health risk associated with obesity. ACSM states that "for most people, obesity-related health problems increase beyond a BMI of 25." Because BMI is based on height and weight, it does not take into consideration frame size (bone structure) or the amount of muscle one may have. Very athletic people with considerable muscle development will often have a BMI value classified as obese while a sedentary person with little muscle development might have a low BMI. BMI is not an accurate predictor of body fat. Again, body composition is the most accurate as it measures muscle and fat, rather than just weight.

Formula for BMI: Divide body weight in pounds by height in inches squared and multiply by 704.5. (*Plug in your values*.)

$$\frac{weight(lbs)}{height(inches)x^2} x\ 704.5$$

Online Version: http://www.shapeup.org/bodylab/frmst.html

CLASSIFICATION of DISEASE RISK on Body Mass Index (BMI) and WAIST CIRCUMFERENCE

		Disease Risk[a] Relative to Normal Weight and Waist Circumference	
Classification	BMI	Men, ≤ 40 in Women ≤ 35 in	Men, ≥ 40 in Women ≥ 35 in
Underweight	< 18.5	No additional risk	No additional risk
Normal	18.5 - 24.9	No additional risk	No additional risk
Overweight	25.0 - 29.9	Increased risk	High
Obesity Class 1	30-0 – 34.9	High	Very high
Obesity Class 2	35.0 – 39.9	Very high	Very high
Obesity Class 3	≥ 40	Extremely high	Extremely high

[a] Disease risk for Type 2 diabetes, high blood pressure and cardiovascular disease. Increased waist circumference can also be a marker for increased risk even in persons of normal weight

(2) ACSM, 2006

TIP: ESW Students can have their blood pressure and body fat measured for free in the ESW department! For the best blood pressure results, wear short sleeves and rest before testing. For the best body composition results, remove shoes and socks and make sure you are well- hydrated. Do not exercise or eat prior to either test.

PHYSICAL FITNESS TRAINING PRINCIPLES

Progressive Overload

Overload is a critical factor in any physical fitness program. In order for the body to improve any of its abilities, it must be worked beyond the point at which it is accustomed to operating. This concept applies to all types and facets of exercise. By running a little faster or farther than usual, forcing yourself to do three more crunches when you don't think you can do even one more, or swimming an extra lap when you feel like quitting, you enable your body to adjust to the increasing demands placed upon it. Without overload (that little extra something you push your body to do) you will not improve! Be sure not to confuse overload with overkill – the key is to progress gradually and systematically. Extreme exertion is not necessary to improve basic fitness levels, and often results in injury or so much discomfort you're likely to give up exercising altogether!

F.I.T.T. Principle

Once you have decided to undertake a conditioning regime, there are a number of things to consider when defining objectives and designing an appropriate program. An easy way to remember these factors is to use the **F.I.T.T**. **Principle** which is an effective way to ensure overload occurs with your exercise program. The key is to progressively overload each component of fitness in order to see benefits. Refer to the FITT Grid at the back of the booklet for a summary.

F = Frequency How often you exercise can determine its effectiveness and safety.

I = Intensity How hard the exercise should be to accomplish specific objectives. Your fitness goals dictate exercise intensity.

T = Time The duration of each exercise session and the corresponding components is, again, highly specific to your exercise goals.

T = Type Which mode of exercise will be determined by what fitness component you are trying to improve.

Reversibility

A third fitness training principle, **reversibility** states that the results of fitness training can be reversed if the training stimulus or overload stops. Research findings have shown that deterioration in all fitness parameters begin to occur just 72 hours after the last workout and continues to degenerate at about the same rate that initial improvements took place. Up to 50% of fitness improvements can be lost in two months! The good news is that fit individuals will regain their fitness at a quicker rate after a stoppage than previously unfit individuals. **Our tip: use or lose it.**

Specificity

The principle of **specificity** states that specific exercises and activities will improve specific components of fitness and corresponding body systems. To improve the condition of the heart, aerobic activities should be performed rather than weight training exercises. To improve joint flexibility, stretching exercises are needed. To see greater muscle tone in the thigh muscles, strengthening movements for the thighs must be done (additional upper arm exercises won't affect leg muscles!)

Individual differences

This principle states that each individual will respond differently to a fitness training stimulus. Even though a group of individuals may all perform the same training (i.e. jogging), each will respond differently based on individual motivation, genetics, fitness and nutrition levels.

Increasing Muscular Strength

An improvement in the area of muscular strength requires an increase in the amount of resistance you usually lift. If you can bench press 100 pounds five to ten times in a row, begin to press more than 100 pounds to become stronger; remember progressive overload! As you become stronger, muscles will increase in strength, tone and size (***hypertrophy***) as they adapt to the greater weight demands placed upon them. (It is rare to see hypertrophy in females as they have less of the male hormone testosterone, however, strength and tone is common.) A general rule of thumb to increase muscular strength is to lift a relatively heavy weight for a few repetitions several times. The following F.I.T.T. model will help to improve your strength.

FITT for Muscular Strength

F = 2 times per week per body part (abdominals may be trained moderately daily)

I = 70% or more of max

T = 3 -5 sets of 3 to 8 repetitions

T = weight machines, elastic tubing, free weights, your own body weight

NOTE: For general toning in a limited amount of time, perform 1-2 sets of 8-12 repetitions.

TIP: To improve muscular strength, complete more sets, less repetitions at a higher intensity level.

Increasing Muscular Endurance

Muscular endurance demands that a muscle group be worked repeatedly. Using the bench press example, imagine you can lift 40 pounds twelve times. To improve muscular endurance, increase the number of repetitions rather than increasing the weight. As muscle endurance increases, so does the general tone of the muscle group, although, there may be little or no enlargement in the size or bulk of the muscle group exercised.

FITT for Muscular Endurance

F = 2 times per week per body part (abdominals may be trained moderately daily)

I = 40-60% or less of max

T = 2 to 3 sets of 12-15 or more repetitions

T = weight machines, elastic tubing, free weights, your own body weight

TIP: To improve muscular endurance, complete less sets and more repetitions at a lower intensity level.

Muscle work, for both strength and endurance, should be done with some resistance (remember the idea of overload) but doesn't necessarily require any fancy machines or gym memberships. You can often use your own body weight as resistance, as with push-ups, squats, lunges, and crunches, or use a variety of hand-held weights or resistance bands. Using equipment especially designed for muscle work is optimal, but not required. Many times women will avoid muscle work because they fear they will bulk up and look too masculine, yet women very rarely have this outcome since they lack the testosterone necessary for significant muscle gain. Women can certainly improve the tone and size of muscles, but will not look like a male body builder by performing a basic muscle workout. Increased muscle mass will help raise resting metabolic rate which helps tremendously to burn more calories at rest and with weight control by increasing metabolism. So ladies, don't ignore your muscles!

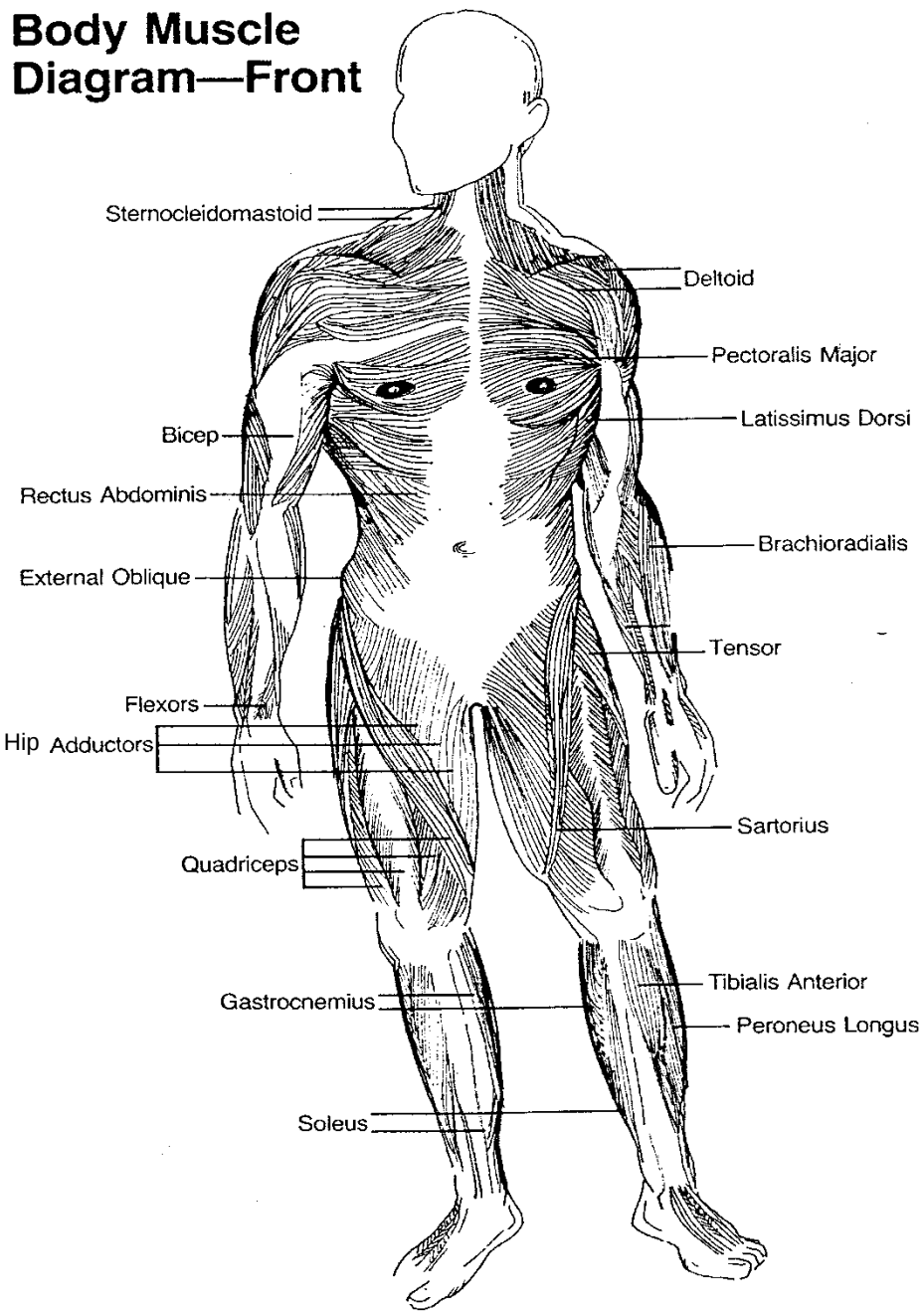
Refer to the table to the right for suggested exercises for improving muscle strength and endurance (not a complete list by any means.) The next page shows a diagram of the muscles you may wish to improve. You may also want to consider enrolling in classes that specifically focus on this component of fitness (ES 023 Weight Training, ES 005 Aerobic Fitness & Weight Training, and EW 006 Total Body Fitness.)

NEWS YOU CAN USE!

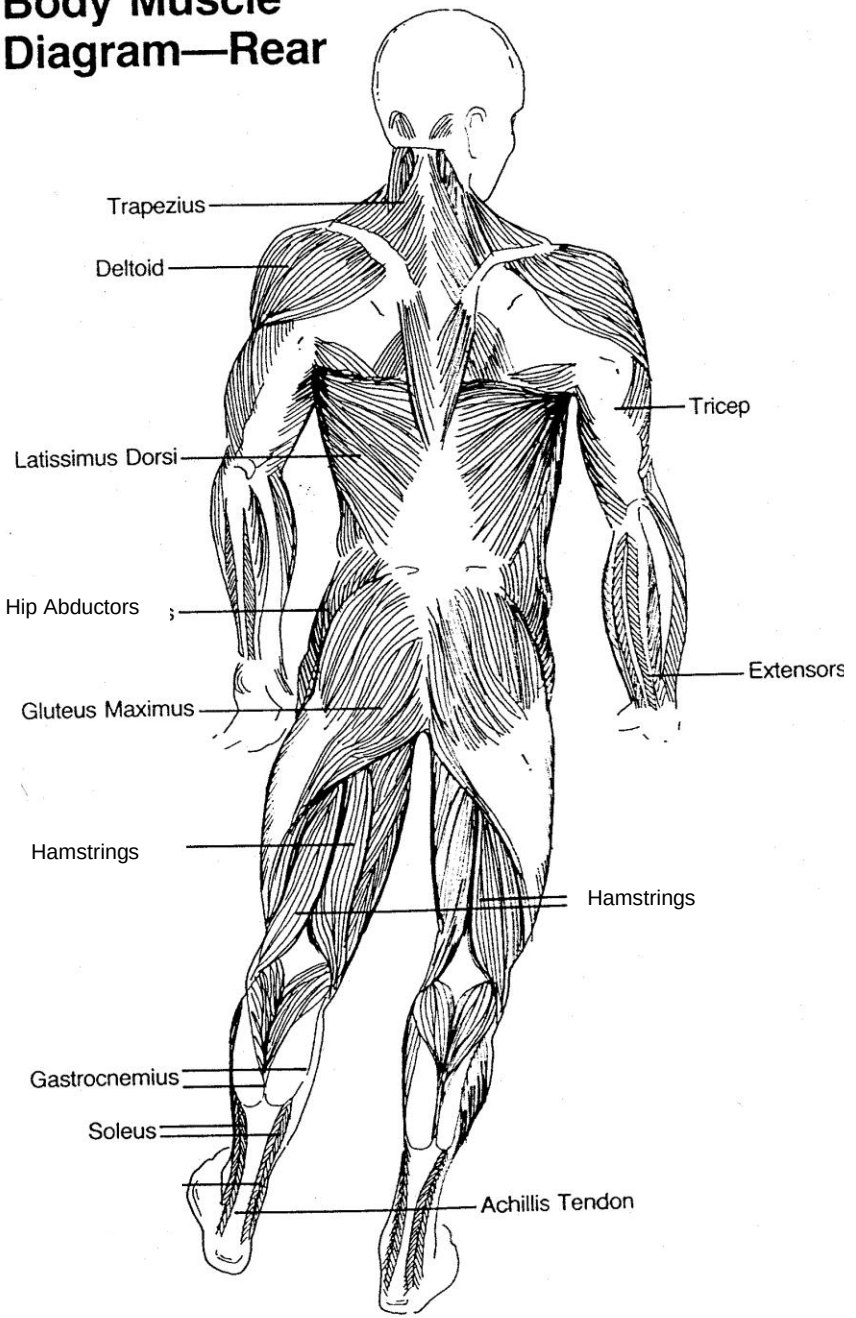
- **Faculty mailboxes** are located in the Exercise Science & Wellness Dept. (room 41-132) AND in the Business Services building
- **Need to Phone Your Instructor**? Search by name or department online or in the back of the Class Schedule
- **Injured**? Go to Student Health Services in Griffin Center; 60-130
- **Final exam** schedule is listed on the back pages of the Class Schedule

MAJOR MUSCLE EXERCISES	
Muscle Group	**Exercise**
Pectoralis Major	Push-ups (wide arms, narrow arms) Flys (lay on back and press weights)
Rhomboids/Mid-Trapezius	Posterior flys One-arm row
Trapezius	Shrugs Upright row
Deltoids	Lateral raises Upright rows Overhead press Upright row into overhead press
Gluteals, Quadriceps & Hamstrings	Squats Lunges (stationary and walking)
Biceps	Arm curls Concentration curls (on knees)
Triceps	Triceps kickbacks Overhead extensions Dips
Gastrocnemius	Heel raise (up on toes)
Tibialis Anterior (shin)	Toe raise (pull toe up)
Abdominal	Crunches Plank (front and side) Crunch with rotation (Oblique) Pelvic tilts
Erector Spinae(lowback)	Back lifts (lay on stomach & lift chest up)

Body Muscle Diagram—Front



Body Muscle Diagram—Rear



Improving Flexibility

The movement in numerous joints becomes limited (resulting in stiffness) if not regularly used throughout the joints' entire range of motion. Flexibility exercises can be done at home, do not require any special equipment, and can serve as a stress management activity. Remember to warm-up prior to static stretching!

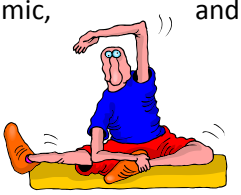
FITT for Flexibility

F = 3 times per week/daily

I = stretch to the point of tension

T = hold static stretches for 15-60 seconds

T = static, dynamic, and contract-relax



Improving Cardiorespiratory Endurance

In order to improve cardiorespiratory endurance one must engage in aerobic exercise which involves moving the large muscles of the body rhythmically and continuously. Walking, dance exercise, jogging, running, swimming, bicycling, cross-country skiing and rowing are examples that can improve CRE if overload is achieved.

FITT for Cardiorespiratory Endurance

F = 3-5 times per week

I = Target heart rate (THR) at **40-85**% or rate of perceived exertion (RPE) of **4-6**

T = 20-60 minutes

T = Aerobic activities (i.e. jogging, biking, rollerblading) will require your body to deliver large amounts of oxygen to working muscles which will improve cardiorespiratory fitness.

Exercising every day may help you cardiovascularly, but be cautious about the effects on other parts of your body: progress gradually. Your instructor can answer questions to help you plan your program so that it is safe, progressive and effective.

Calculating Target Heart Rate

An effective way to monitor intensity is to determine your ***Target Heart Rate Zone (THR)*** which will provide you with an estimated range of how hard your heart should be working during aerobic activity.

Calculating your THR involves a minor calculation using the Heart Rate Reserve Method based on your age, ***resting heart rate (HRrest)*** and estimated ***maximum heart rate (HRmax)***. To determine HRrest, find your pulse and count it for one full minute or for 30 seconds and multiply by 2. Ideally, you should do this first thing in the morning or after you have been resting quietly. Record this value in ***beats per minute (BPM)***. Maximum heart rate (HRmax) is the greatest number of times the heart can beat per minute, and is estimated by using Gellish's age-adjusted formula (multiply .67 by your age, then subtract this value from 206.9) or directly measure during a maximal exercise test. Refer to the box on the next page to calculate your THR zone. *Hint: The high end will never be more than your maximum heart rate, and the low end will not be less than your resting rate.*

Target Heart Rate & Intensity

Intensity refers to how hard or intense you should exercise to achieve positive training effects without getting injured. Individuals with health conditions, new exercisers, or those who do not exercise regularly should exercise within a low intensity range while those in relatively good shape who participate in frequent exercise can work toward the high end of their THR zone. It is better to begin at a lower intensity and gradually increase to the higher end of the zone – speak with your instructor for additional input on what is best for you. As you become more fit or change your goals, it is common to adjust. Choose your appropriate intensity zone:

- **New exercisers or those with health issues (Zone 1):** THR zone: 40-50% up to 50-60% (low intensity)
- **Beginning/intermediate exercisers (Zone 2):** THR zone: 60-75% (moderate intensity)
- **Physically fit individuals (Zone 3):** THR zone: 70-85% (high intensity)

Using THR During Exercise

Monitor your heart rate periodically during an aerobic workout by taking your pulse within 10 seconds of stopping exercise. Count the pulse for 6 seconds and multiply by 10, or count for 10 seconds and multiply by 6 (a 10 second heart rate conversion chart is also at the back of the booklet.) Ideally your exercise heart rate will be within your Target Heart Rate zone, which means you are maximizing the fitness benefits from your cardio workout. If your exercise heart rate is below the low end of your THR, increase intensity. Likewise, decrease intensity if the heart rate is above the high end of the zone.

Calculating THR Zone

Formula: (Intensity in decimal form)(HRmax – HRrest) + HRrest

Example:

- Luis is 40-years old
- Resting HR (HRrest) = 72 bpm
- Beg/intermediate exerciser so his intensity range is Zone 2 or 60-75% according to ACSM guidelines
- Estimated Max HR (HRmax) =206.9 – (.67 x age)

#1 Calculate Estimated Maximal Heart Rate:

206.9 – (.67 x 40 yrs) = 180.1

#2 Convert intensity to decimal:

60% = .60 (Low end)

75% = .75 (High end)

#3 Calculate Low end of Target Heart Rate Zone(Plug numbers into the above equation):

= (.60)(180.1 - 72) + 72

= (.60)(108.1) + 72

= 64.86 + 72

= 136.86 bpm

#4 Calculate High end of Target Heart Rate Zone:

Repeat step 3 but change the intensity to the High end value

= (.75)(180.1 - 72) + 72

= (.75)(108.1) + 72

= 81.08 + 72

= 153.08 bpm

Answer: Luis' THR Zone is 136.86 to 153.08 bpm

(May be rounded to 137 to 153 bpm)

Rate of Perceived Exertion (RPE)

Another mode to monitor exercise intensity is to use the RPE scale which involves subjectively rating exercise intensity on a scale of 1 to 10. RPE is especially helpful for those unable to measure pulse or those taking medications that effect heart rate response.

To use the RPE scale, the American College of Sports Medicine states *"pay close attention to how hard you feel the exercise work rate is. This feeling should reflect your total amount of exertion and fatigue, combining all sensations and feelings of physical stress, effort, and fatigue. Don't concern yourself with any one factor such as leg pain, shortness of breath or exercise intensity, but try to concentrate on your total inner feeling of exertion. Try not to underestimate or overestimate your feelings of exertion; be as accurate as you can."* Refer to the RPE Scale below.

Borg's Rate of Perceived Exertion (RPE) Scale

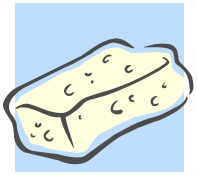
1	Very weak exertion
2	
3	Moderate exertion
4	
5	Strong exertion/heavy effort
6	
7	Very strong
8	
9	
10	Extremely strong
	Absolute maximum

IMPROVING BODY COMPOSITION

Applying the FITT principle to this component of physical fitness can be a bit more involved. Many individuals have likely attempted to change body composition, with most wanting a little more muscle and less fat. You know how to increase muscular strength and endurance, which increases lean mass, and thus, improves body composition. Exercising aerobically teaches the body how to use stored fat as a fuel source. So why might losing excess body fat be a challenge?

The human body has amazing self-preservation mechanisms, one of which is a predisposition to store fat extremely efficiently for survival purposes (our ancestors often had to go for periods of time without food, during

which the body had to rely on stored fat for energy.) The average adult has approximately 30 to 40 billion fat cells which, if completely empty and arranged in one space, represent a volume approximately the size of a clenched fist.



A fat cell is very much like a sponge in that it can shrink as well as swell, and has the capacity to increase its size considerably. If each of the body's billions of fat cells were filled to capacity, they could weigh over a quarter of a ton; and be sizably abundant enough to stuff a small sofa. By the same token, they can shrink and become very small, and it is believed that the cells themselves never disappear in humans.

Heredity has a significant effect on the number of fat cells an individual body contains (you usually have a basic body type similar to one or both parents), but it is not the only factor. Previously, the predominant theory regarding fat storage stated that despite fat cells' ability to expand in size, the actual number of fat cells would not increase in adults. Our current obesity epidemic in children is demonstrating a new theory that excessive caloric intake may result in the development of new fat cells in kids.

Effects of Low Calorie Intake

Weight loss is all about creating an energy deficit – eating fewer calories than our body expends each day. However, creating too large of a calorie deficit can backfire on you. Our bodies are smart, and will adapt for survival. When calories are severely limited, your body thinks it's entering a famine, and that it needs to do more with fewer calories. Your body adapts to the restricted caloric intake, and uses fewer calories to perform the same tasks. Thus your metabolism slows down and energy and fat are conserved not burned.

Metabolism is the rate at which the body burns fuel for energy. The basal metabolic rate is the minimum number of calories necessary to perform daily basic functions such as breathing, growth, cellular repair and digestion. When calories are restricted the body will try and compensate by holding on to the few calories that are consumed.

Additional drawbacks to a serve reduction of calories include:

1. **Malnutrition** – A diet with extremely low calories does not allow for adequate consumption of the vitamins, minerals and antioxidants the body needs to perform its daily life processes. Vitamin deficiencies can lead to various problems, including fatigue and impaired immune system.

2. **Muscle loss** – Your body requires a certain amount of protein for growth, repair, electrolyte balance and maintaining the immune system. When protein intake is restricted the body will burn its' own muscles or organs to acquire the needed protein. Individuals that follow very low calorie diets may lose weight but also lose a great deal of lean body tissue which will also result in a lower metabolism.

3. **Ketones** – When carbohydrate is limited due to fasting, starvation or very-low calorie diets, production of ketones increases as a result of fat metabolism. Ketones are acidic and the body tries to eliminate them through urine which causes dehydration. High levels of ketones can be toxic and in severe cases can lead to coma or death. Symptoms of ketoacidosis include dizziness, lethargy, thirst and a very distinctive breath odor.

4. **Foggy brain** - The brain, which accounts for 2 percent of our body weight, uses roughly 20 percent of our daily calories. As a picky eater, it demands a constant supply of glucose – primarily obtained from recently eaten carbohydrates (fruits, vegetables, grains, etc). Ever wonder why you get a little dizzy or get a headache when you haven't eaten in a while? Avoid low carbohydrates diets as they do not provide the brain with adequate fuel.

5. **Disordered eating** – Dieting often results in obsession about food. Very restrictive diets (under 1200) can cause symptoms of depression, irritability and social withdrawal. Even skipping meals – a technique often used to lose weight – can cause emotional symptoms within hours. Withholding calories can also lead to another disordered behavior – binge eating (periods of uncontrollable eating).

Behaviors that negatively affect your health or daily functioning are disordered. All of the habits listed below can be disordered:

- A very strong fear of gaining 5 pounds
- Following strict food rules
- Dieting for more than three-quarters of your life
- Use of diet pills or laxatives
- Fasting or juice cleanses to lose weight
- Over exercising
- Cutting entire food groups from your diet, except for religious reasons
- Eating the same "safe" foods every day
- Extreme calories restriction
- Thinking about food more than 50 percent of the time
- Obsession calories counting
- Intentionally skipping meals to lose weight
- Binging or vomiting
- Smoking for weight loss
- Lying about how much you've eaten
- Weighing yourself daily, if it becomes obsessive
- Consistently overeating when you're not hungry
- Eating a lot of no- or low-calorie foods
- Considering foods to be good or bad
- Visiting pro-anorexia or pro-bulimia websites
- Adopting a vegetarian diet solely for weight loss

If you or someone you know is suffering from an eating disorder please seek help immediately. Eating disorders are serious and can be life threatening. To find an eating disorder treatment specialist in your area, you can contact your primary care doctor, school counselor or nurse. You may also call the National Eating Disorders Association's toll-free hotline at 1-800-931-2237 (Mon–Fri, 8:30 a.m. to 4:30 p.m. PST).

http://www.nationaleatingdisorders.org/find-help-support

Best Approach for Maximal Fat Loss

The most safe and effective fat loss approach involves a **combination of a small reduction in calories (food), and regular exercise**. "Slow and steady wins the race" is probably not what most dieters want to hear. Unfortunately, many have been brainwashed by fad diets that promise fast results or "miracle plans". Added fat did not come on your body overnight and it will take time and patience to lose it. The approach to weight loss is based on the Energy Balance Equation which states that the amount of calories one takes in via food must be equal to the number of calories burned to maintain current body weight. To lose weight, the number of calories in must be LESS than the calories out. However, it is very important to NOT go below your R**esting Metabolic Rate** (RMR).

Even at rest your body is still at work. Your heart is beating, your lungs are allowing you to breathe and your body is carrying out vital functions such as making new cells and eliminating waste. Your brain is overseeing and controlling all of these functions. This work is considered your metabolism. The rate at which your body utilizes calories to do this work is your "resting metabolic rate". In order to lose weight safely and permanently without lowering metabolism and causing the other negative health effects discussed earlier, you must not consume fewer calories than what is required by your RMR.

Know Your Numbers

Take a minute right now to rethink your weight loss goals, and remember you are in this journey for the long haul. It is best to make changes based on health goals and not for a particular number on the scale. A diet is often considered temporary and something you can start and stop. An eating plan is for life. Accept that healthy weight loss is slow and steady. Your goal should be ½ to 1 pound per week. There is approximately 3500 calories in one pound of body fat which is a lot of calories and is the same number of calories in ¾ gallons of chocolate ice cream! In order to lose one pound of fat per week, you must create a caloric deficit of 500 calories each day (3500 calories per pound divided by 7 days in a week). Two pounds of fat loss may be acceptable for some but it requires 1,000 calories less per day, (for most people this is a fairly drastic and unattainable goal without going below RMR).

Calculate your RMR – see calculation at the back of this booklet.

Online calculation tool can be found at the following link: http://shapeup.org/resting-metabolic-rate-calculator

Weight Loss Theories

The principles of fat loss previously discussed are valid and based on scientific research and evidence. On a practical level, anyone who has ever dieted knows that the fat reduction game is not as clear cut as science and the Energy Balance Equation would have us believe.

Some experts have suggested that the "yo-yo" syndrome typically experienced by dieters may occur in part due to a biological phenomenon referred to as the body's set-point. The **SET-POINT THEORY** proposes that each person's body becomes accustomed to a certain weight, or body composition, and various things occur at the cellular level to maintain this set-point even though calories are reduced, or for that matter, increased. Think of it being like a thermostat on a furnace in your home - you set the thermostat to maintain an environmental temperature you find comfortable, and if the temperature in the home rises or drops, the furnace automatically comes on or shuts off to restore the previously designated temperature.

A possible new theory based on research published in the British Journal of Nutrition (May 2013) states a diet high in saturated fat and simple carbohydrates may set in motion a chain reaction of "metabolic dysfunction" involving the appetite regulating hormones leptin and ghrelin. Leptin's job is to suppress appetite, ghrelin's to increase it. Such diets may change/damage nerves that conduct signals through parts of the brain, affecting the function of appetite hormones and thus the body's ability to regulate weight and metabolism.

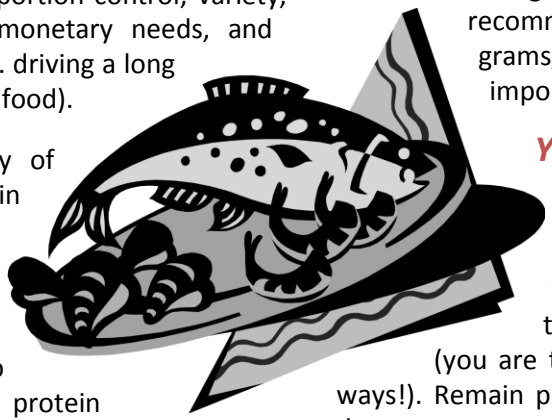
Don't Despair!

Obesity can be changed through diet, exercise, persistence, and patience. It can take the body a long time to adjust to a new weight or body composition, and the slower the process, the more readily the body will accommodate the change. Changing habits is a process! This is an important reason why fat reduction should be done gradually as previously discussed. Most individuals who have lost weight rapidly gain it back soon after concluding their diet regimens for a number of reasons. When the body perceives a severe reduction in calories as starvation, it responds to insure survival and reduces energy needs by slowing down metabolism. A weight training program can help to keep metabolism elevated even at rest, as an increase in muscle mass increases

metabolism. Again, exercise and healthy eating plans are key!

Myths

BEWARE of diet gimmicks promising rapid and effortless weight loss - many are merely money making tools for a ruthless con-artist! The $60 billion diet (weight loss) industry is big business in America – pun intended. Not only do these diets rarely work as promised, they can actually be quite dangerous. Avoid diet plans that do not allow for a wide variety in the foods consumed because they most likely will not provide an adequate amount of the essential nutrients your body needs. Look for eating plans that: teach you to modify behaviors, portion control, variety, are within your cultural and monetary needs, and convenience (cooking yourself vs. driving a long distance to pick up pre-packaged food).



Be conscious that the majority of weight loss diets are high in protein while keeping carbohydrates and fats to a minimum. As you remember, an active body needs an ample supply of carbohydrates to function properly. Also, excess protein (or excess calories from any source) will be converted and stored as body fat. Protein-rich diets usually result in quick initial weight loss, but the loss is primarily water and not fat.

For those wishing to trim down thighs or reduce their spare tire around the middle, research has repeatedly shown that it is impossible to **SPOT REDUCE**. Each person has a genetic predisposition to store fat in particular areas of his or her body: each of us will usually store fat in the same places as parents and siblings. Body fat is lost generally all over the body: not from one place at a time. Exercising a specific muscle group will tone that muscle group, but will not burn the layer of fat directly over the muscle group. *(If excessive exercise of a selected area of the body burned fat from only that particular spot, wouldn't all habitual gum chewers have super skinny and lean cheeks? There are lots of pudgy-cheeked gum chewers out there...)* In other words, to slim down one's thighs, an individual must follow a diet and exercise approach designed for general fat loss: reduce calories consumed and increase physical activity. A body's genetic map will dictate the areas from which fat will be taken, and there is literally nothing, short of surgical removal of fat cells (a process known as ***liposuction***), that can change this. Cellulite wraps (cellulite is nothing more than normal body fat), reducing creams, and thousands of leg lifts will not reduce fat deposits! Again, when you reduce fat in general, those trouble spots will change, but only to the degree that your body dictates. You must learn to accept your body type and keep your goals reasonable within your genetic limitations.

Colonic irrigation or "cleansing" is also unnecessary and can have dangerous side effects. The body is well equipped with the liver and kidneys to rid the body of toxins. Any weight loss resulting in this method is temporary and mostly water. Colon health is enhanced by increasing fiber intake. Americans typically do not consume enough fiber only 10-15 grams but the recommendation is closer to 20-35 grams/day. Drinking plenty of fluids is also important.

You Can Do It!

It may be as long as six weeks before you notice any significant results of your diligent efforts to improve your fitness. Be assured, that changes are taking place but in very subtle ways (you are training your body to function in new ways!). Remain patient, consistent, and persistent, and do not expect to achieve your fitness objectives overnight!

We hope it is apparent that maintaining physical fitness is a lifetime commitment - you cannot improve to a certain point and stop, expecting that level of fitness to remain intact. What took you a long time to develop can be lost rather quickly, so **make exercise an integral part of your lifestyle.** If you have trouble fitting exercise into your busy day, enroll in one or two exercise science courses at Grossmont each semester. This way, you can plan it into your daily schedule and exercise will start to become routine. After a few years, you'll have an excellent chance of developing a lifetime habit which will help you control your weight, reduce your stress, decrease your risk for many diseases, and provide hours of fun and enjoyment!

SIX ESSENTIAL NUTRIENTS

The body requires certain nutrients, all of which play a vital role in the health of an active individual. It is important to become familiar with the body's basic needs, after which you can make better choices in the food you eat.

Your body needs six nutrients to function efficiently: **carbohydrates, fats, proteins, vitamins, minerals, and water**. The first three are or can be, fuel sources for the body, and the others are instrumental in facilitating internal processes. A well-rounded diet with foods taken from all the basic food groups (dairy products, breads and cereals, fruits and vegetables, and meat/protein) helps to insure that the body gets the essential nutrients it needs. Knowing the role each nutrient plays in the body's functioning can help you become more aware of what is needed in a nutritionally sound diet.

Carbohydrate

Researchers have suggested that approximately 45% to 65% of one's diet should consist of carbohydrates. This nutrient is the body's primary and most efficient fuel source, and is found mostly in cereals, grains, fruits and vegetables. Carbohydrates are often grouped into two categories: ***simple carbohydrates*** (found in table sugar, honey, candy, soft drinks and often thought of as less healthy to eat) and ***complex carbohydrates*** (found in grains, fruits and vegetables often considered the healthier type). The body breaks down and utilizes simple and complex carbohydrates identically as a fuel source (glucose), but other differences in the two types have various ramifications. Experts now know that carbohydrate digestion is a much more complicated process and are grouping them into sugars, fibers, and starches (potatoes, rice). For instance, most complex carbohydrates are found in foods that also have a relatively high fiber content. Fiber is critical to digestion and waste evacuation. We need 20-35 grams of fiber per day and the average American gets only half that amount. Researchers at Harvard found that a high intake of fiber resulted in a 40% risk reduction for heart disease! Carbohydrates with fiber take a longer time to digest (slow burning fuel) and are said to have a low glycemic index. (***Glycemic index*** is a way to classify carbohydrates based on how they boost blood sugar.) Simple carbohydrates, on the other hand, are often found in more processed foods which are often low in fiber, high in calories and not 'nutrient dense' meaning that you'll consume lots of calories with little nutrients (think fast burning fuel and high glycemic index). Processed foods are those items that have undergone much alteration from their original source – *Twinkies, cookies, crackers, and Flaming Hot Cheetos.*

Your diet should consist of mostly complex and unrefined sources; such as whole grains, fruits, and vegetables. Avoid overly processed or sugary foods. Remember that excess carbohydrates, not burned or stored in the muscles and liver will be converted to and stored as fat . . . so stay active!

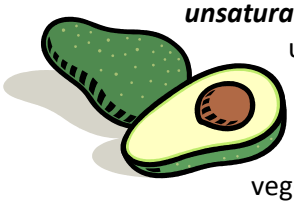
Fat

It is recommended that fat contribute 20% to 35% of one's total dietary intake. Saturated fat intake should be less than 7%-10% of total energy and trans fat kept at an absolute minimum. Higher intakes of fat increase the risk for obesity and its complications, such as heart disease and diabetes. However, it is important to note that diets too low in fat and too high in carbohydrates can also increase risk of heart disease.

Although people trying to lose weight may believe they need to consume less than 20% of their total calories from fat but evidence shows that doing so may do more harm than good especially if the diet is also very low in calories (less than 1500) – see "Effects of Low Calorie Intake". Most people feel more satisfied and are less preoccupied with food with fat kept at 20-25 percent of total energy intake.

Despite their sometimes bad reputation, fats have many important functions. Body fat provides protection for internal organs, helps insulate the body (ever notice that your skinny friends are chronically cold?), and serves as a fuel reserve. Small amounts of fats are also essential to the construction of cell walls and in the manufacture of some hormones. Fat contained in food (dietary fat) serves a critical role in certain vitamins (A, D, E and K) which can only be carried and stored in fat. Foods with a relatively high fat content tend to be more flavorful than foods low in fat, and a higher fat content in meat contributes to the meat's tenderness. As you can see, fat isn't all bad.

There are three types of dietary fats: ***saturated***, ***unsaturated*** and ***transfat***. Fats are made up of a glycerol molecule and fatty acids. More solid types of fat, known as ***saturated*** are found in butter, animal fat, and certain vegetable sources (palm and cottonseed oils, shortening) and have been found to



contribute to atherosclerosis (hardening of the arteries) and coronary heart disease by raising LDL cholesterol (the lazy cholesterol). ***Unsaturated*** fats, typically found in vegetable sources (olive, canola, peanut, avocado) do not have negative effects on heart disease. One type of unsaturated fat you may have read about is ***omega-3 fatty acids*****,** which decreases the risk of heart disease and helps lower blood pressure levels.

Recent technology has allowed us to convert unsaturated fat into a more solid type of fat for use in baking, cookies, and other packaged foods. Unfortunately, this process (known as **hydrogenation**) creates ***transfat***, which has similar negative effects on our arteries, as does saturated fat, plus it decreases HDL cholesterol (the helpful cholesterol)! (There are also some naturally occurring trans-fats in dairy and animal products.) It is important that you learn to read the label on packaged foods, so you can determine how much saturated fat is in the food, as well as any hydrogenated oil.

Despite the type or source of fat, a diet high in fat means there are more fat calories available for the body to fill fat cells, thereby contributing to the overall fatness of an individual. As you will read in the next section, dietary fats also have an impact on heart disease. Research indicates that currently about 37% of the average American diet is comprised of fat, which may reflect why heart disease, atherosclerosis and obesity are such rampant health problems in our culture.

Protein

It is recommended that protein make up 10-35% of one's total dietary intake. It is best to calculate protein by grams per kilogram body weight. The average sedentary adult needs .8 grams of protein per kilogram of body weight per day. On average, most Americans easily consume 14% to 16% of their total daily intake as protein.

Proteins are long chains of nitrogen-containing molecules called amino acids. These amino acids are regarded as the 'building blocks' of the body as they are essential for the growth and repair of body tissues. Although protein is important, most American adults consume much more of it than they need, which has interesting ramifications. Most of the popular protein sources, (red meat, eggs, cheese) also tend to be relatively high in saturated fat, so as an individual increases protein intake, fat intake also increases. Protein is converted to amino acids and sits in a pool ready for use – any extra is easily converted to fat and stored in fat cells. In addition, the breakdown of protein requires a fair amount of calcium, and excess intake of protein can result in either reduction of calcium absorption by the bones or the body actually taking calcium out of bones to provide enough for protein digestion. The loss of calcium from the bones or the inhibition of its absorption into the bones may result in an increased risk for ***osteoporosis*** (a condition where the bones become less dense and more brittle).

Minerals

Minerals are essential to maintaining the internal chemical balance of the body and play vital roles in many bodily functions. Examples of these functions include muscle contraction (potassium), maintenance of proper water content in the blood and entire body (sodium), growth and repair of bones and teeth (calcium), and regulation of the blood's ability to transport oxygen throughout the body (iron). Most minerals are contained in a well-balanced diet, but mineral supplements are available for those whose dietary sources are inadequate.

Vitamins

Vitamins act as catalysts and regulators in our body processes by assisting the body in utilizing other nutrients. The body is able to manufacture only one vitamin, Vitamin D (produced in the presence of sunshine), so the body must acquire all other vitamins from dietary sources. Classified as either ***water soluble***, meaning that they are transported in a water-based medium, or ***fat soluble***, stored and carried in fatty substances, there are possibly more than the twenty-six currently identified vitamins, many of whose functions have yet to be fully understood. Because they are so essential to bodily functions, many individuals assume that *mega-doses*, the ingestion of vitamins that far exceed the Recommended Daily Allowances, will insure maximal health. (Recommended Daily Allowances or RDA is the average daily nutrient intake level sufficient to meet the nutrient requirement of nearly all (97 to 98 percent) healthy individuals in a particular life stage and gender group.) Interestingly, the excess water-soluble vitamins not needed by the body are eliminated as waste while the fat-soluble vitamins (A, E, D, and K) are stored in body fat and organs. High levels of these fat-soluble vitamins can be toxic, and may cause various physical problems as a

result of excessive accumulation. In regard to vitamins, the tendency for Americans to believe that more is better not only inspires the quip that we have the most expensive urine in the world (all those excess water soluble vitamins being eliminated as waste) but also can lead us dangerously close to upsetting the delicate chemical balance maintained by our bodies when appropriate vitamin levels are present. For many reasons and for many people, dietary sources do not adequately provide the essential vitamins, and supplementation may be in order. It is wise to check with a registered dietician or physician to identify your needs and help avoid potentially dangerous amounts of vitamins before you start supplementing your diet with vitamins.

Water

Water comprises approximately 60% of your total body weight. In addition to providing a medium in which all the body's chemical reactions take place, it plays a crucial role in temperature regulation, transportation of nutrients, wastes, and hormones. Water is also a vital component of blood and other fluids essential to the survival of the body.

Be sure to consistently provide your body with plenty of water, paying particular attention to its need for fluid during and after exercise. The Institute of Medicine advises that men consume roughly 3.0 liters (about 13 cups) of total beverages a day and women consume 2.2 liters (about 9 cups) of total beverages a day. The term cup means a measured cup, not the size of your super-size coffee mug. Additional fluid intake is needed to stay hydrated during and after exercise, especially in the hot weather indicative of El Cajon! Avoid getting thirsty, as this signal indicates the body is deficient in water and, therefore, not operating under optimal conditions. Two common myths are that:

- Drinking water during exercise causes cramps
- Drinking during exercise isn't helpful nor needed

Not drinking when you need to, especially before, during, and after exercise, can make you dehydrated, which can lead to serious medical consequences. If you drink way too much water (i.e., a gallon all at once) it can cause cramps so drink smaller amounts of water – a few gulps here and there.

But I'm An Athlete, Aren't My Needs Different?

In short – No!

Per the American College of Sports Medicine and the Academy of Nutrition and Dietetics, athletes do not need a diet substantially different from the recommendations in the Dietary Guidelines for Americans. Energy (calorie) needs for an individual athlete will depend on the type, duration, frequency, and intensity of the exercise along with sex, age, body size and body composition. If calories are inadequate, fat and protein will be used to fuel the body and lean body mass will be lost resulting in a loss of strength and endurance. **It's been suggested that the acceptable macronutrient distribution ranges for all athletes, including vegetarians, are 45% to 65% of calories from carbohydrate, 20% to 35% from fat, and 10% to 35% from protein.**

First and foremost, athletes need to consume enough energy to maintain appropriate weight and body composition for their sport. Sport dietitians use a variety of methods for calculating energy needs. The DRI method and the Harris-Benedict equation are typically used to estimate total energy expenditure at the back of the booklet.

High protein diets have been popular throughout history especially among athletes. The truth is most Americans already eat almost twice as much protein as they need for muscle development. Thus, athletes can easily meet their increased needs if they are consuming the proper amount of calories required for their sport and training routine. The dietary allowance (RDA) is 0.8 grams/kg body weight. This is the minimum to prevent deficiency and the ACSM and Academy position recommends amounts slightly higher for most athletes. **The recommendation is 1.2 to 1.7 g/kg of protein for strength athletes and 1.2 to 1.4 g/kg for endurance athletes.**

The Truth about Protein Powder and Amino Acid Supplements

Research has shown that protein powders and amino acid supplements are not necessary to enhance muscle. In fact, such supplements have not shown a positive impact on athletic performance. A recent study in the Journal of the International Society of Sports Nutrition looked at the effects of consuming a very high protein diet. The experimental group consumed five times the

recommendation (4.4 g/kg/day) by taking mostly whey protein supplements compared to the control group who ate only 138 grams/day (well within the recommendation for athletes). The experimental group consumed 800 more calories but only gained .9kg more than the control group. Of that weight gain only .6 kg was considered lean muscle mass. This was far less than expected and statistically insignificant. For athletes who want to bulk up and add muscle, Sports Dietitian and author, Nancy Clark, recommends they not waste their money on protein supplements but rather focus on following a meal plan that will supply adequate calories, carbohydrate, protein and fat each day. Protein should be distributed equally throughout the day and emphasis should be placed on consuming high-quality protein. An athlete's diet should always be thoroughly assessed before turning to supplements.

New and Improved: Choose My Plate

The U.S.D.A. updated the pyramid in 2011 to "Choose My Plate" which helps people to visualize a healthy balance of different foods on their plate. Their helpful website (choosemyplate.gov) provides a great tool to help you plan healthy eating based on your personal profile. You have a chance to use this interactive tool when completing the "Your Own Personal Plate" assignment located at the end of the booklet. More information about this assignment and its due date will be given in class.

When navigating this site, take particular note of what constitutes a **serving size** which is defined as a unit of measure that describes a recommended amount of a certain food. A serving size does not equal a portion size. Most Americans struggle with portion sizes, often eating much more than is needed or recommended which often leads to a gain in body fat. A **portion size** is the amount of food you choose to eat. There are recommendations for healthy portion sizes (ie. Protein serving = size of a woman's palm). Get to know these recommendations and make sure to read food labels.

What is a Serving?

Carbohydrate group:

- 1 slice of bread
- ½ cup cooked rice or pasta
- ½ cup cooked cereal

Vegetable group:

- ½ cup chopped raw or cooked vegetables
- 1 cup of leafy raw vegetables

Fruit group:

- 1 piece of fruit or melon wedge
- ¾ cup of fruit juice
- ½ cup canned fruit
- ¼ cup dried fruit

Dairy group:

- 1 cup milk or yogurt
- 1.5 ounces natural cheese
- 2 ounces processed cheese

Meat/protein group:

- 2.5-3 ounces cooked lean meat, poultry or fish
- ½ cup cooked beans
- 1 egg
- 2 tablespoons of peanut butter

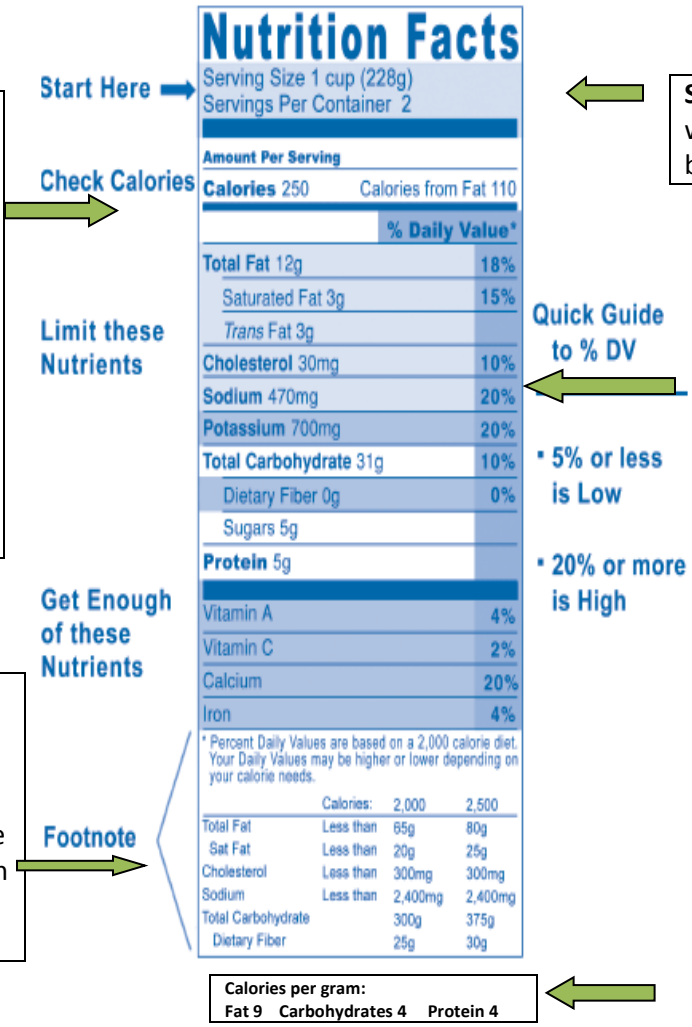
Fats & Sweets:

- Allow yourself a few fun foods in this category, but keep them to a minimum!

READING FOOD LABELS

Learning to read food labels is an important skill that shows you exactly what you are putting into your body, and empowers you to select appropriate foods to balance your diet. Start making it a habit to check the labels on all the foods you buy at the store or grab from your kitchen cupboard. Use this tool to get a feel for the balance of fats, carbohydrates, and proteins you need for healthful living. The first step to label reading is to note the serving size!

CALORIES: Total calories are listed as well as calories from fat. In one serving of this item, 110 of the 250 calories are from fat!! To calculate the % of calories from fat, divide the fat calories (110) by the total calories (250) and multiply by 100.
110 ÷ 250 = .44 x 100 = 44%
44% of this food's calories are from fat!



SERVING SIZE: This is the size on which all other information is based

% DAILY VALUE: Tells you what percent of the recommended daily intake of a nutrient is available in this food per serving (based on a 2000 calorie intake per day

DAILY VALUE FOOTNOTE: Lists the recommended nutrient intake for a person eating 2000 or 2500 calories per day. Your daily values maybe higher or lower depending on how many calories you eat each day

CALORIE CONVERSION INFORMATION: Provides the number of calories in the energy-yielding nutrients (fat, protein & carbohydrate)

INGREDIENTS: Below the label is a list of all the ingredients in descending order of the amount contained in the food

Heart Disease –

The Nation's #1 Killer

Currently in the United States, 83 million adults live with one or more types of cardiovascular disease. In 2008, over 616,000 people in the United States died as a result of heart disease, our nation's number one killer. Research over the last 25 years has shown a direct link between lifestyle choices and heart disease. The American Heart Association has identified six major risk factors for heart disease, all of which are controllable by how we behave. In other words, many people who die from heart disease each year (your loved ones...) could have prevented or postponed this deadly malady by making healthier lifestyle choices.

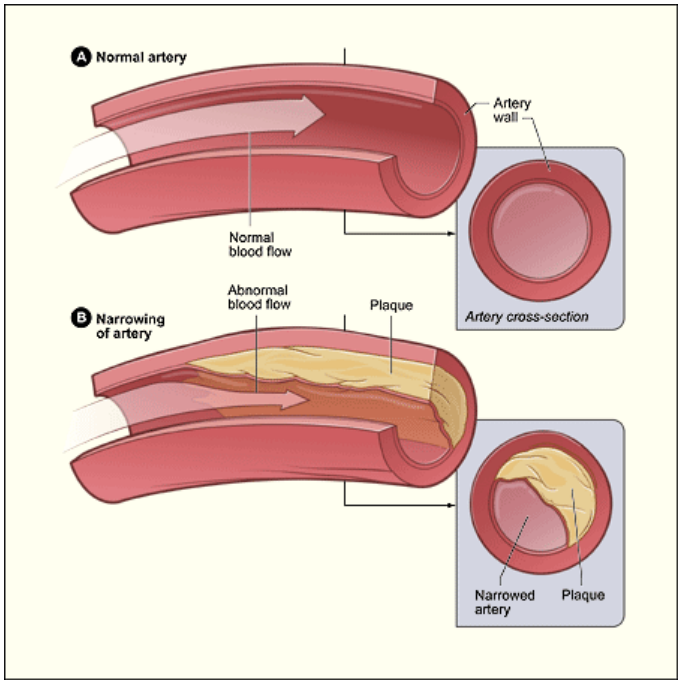
In addition to ***controllable*** risk factors, there are also ***uncontrollable*** and ***contributing*** factors. Age, gender, family history (genetics) and race are uncontrollable because you cannot change these factors. Examples of contributing risk factors are stress, alcohol and drug use. Having multiple risk factors greatly increases the likelihood of developing heart disease and we can prevent the controllable risk factors through our choices and daily habits.

Many folks mistakenly think heart disease applies mostly to older males—heart disease is the number one cause of death for females as well!

6 Risk Factors for Heart Disease

1. Sedentary Lifestyle
2. Smoking
3. Obesity
4. High Blood Pressure
5. High Cholesterol
6. Diabetes

Having one or more of these risk factors helps to create clogged and hardened arteries, a condition known as ***atherosclerosis***. Atherosclerosis occurs when a fat-like substance, known as ***plaque*** (made up of fats and cholesterol among other things) builds up on the walls of the arteries, thereby reducing the area available for blood flow, as seen in the following diagram.



Cholesterol

It is important to know what cholesterol actually is, where it comes from, what it does, and why everyone is making such a big deal about it!

The human body manufactures cholesterol in the liver, producing approximately 1,000 milligrams per day. The only other source of cholesterol is found in animal products such as meat, dairy items, eggs, and organ meats (liver, kidney.) Considering that these products are common in the average American's daily diet, one can see how elevated cholesterol levels in the body can occur.

Cholesterol has a waxy consistency, much like the wax found in the human ear. Given this characteristic it is easy to see how cholesterol can accumulate in the arteries. Have you ever gotten a waxy build-up in your ears? Just imagine that kind of stuff building up on the inside of your blood vessels!

In spite of the nasty reputation cholesterol has earned over the past few years, it does play very crucial roles in the functioning of the human body. Cholesterol forms the backbone, so to speak, of the cell walls in the body. It provides substance to these cells and enables them to maintain their integrity while allowing the transport of materials in and out of cells through cell membranes. Cholesterol is also vital to the production of various hormones and steroids that regulate body processes. As

you can see, we need cholesterol to sustain life, but in excessive amounts it can be a damaging factor in one's health. Our livers, however, produce more than we need on a daily basis, so we don't need to consume high doses of cholesterol through food. Concerns about cholesterol stem from the fact that it can contribute dramatically to the development of heart disease. As previously mentioned, the deposit of cholesterol in the arteries decreases the pathway for blood. When a vessel becomes so clogged that blood flow becomes restricted or stopped altogether, a ***heart attack***, ***stroke***, or ***angina*** (pain in the chest, throat, back, or shooting pain down the arms) can result, often to a fatal degree.

You might be thinking that you can avoid a cholesterol problem by cutting it out of your diet and eating foods with little to no cholesterol, or those advertised as 'cholesterol free', such as the peanut butter, margarine, and cookies. For some, this strategy can make a difference, but more importantly, is the amount of cholesterol in the bloodstream. Research shows that the mix of fats in your diet (i.e. saturated vs. unsaturated vs. transfat) is the biggest influence on blood cholesterol and not necessarily the amount of cholesterol ingested from food.

The transportation of cholesterol through the body remains one of the most critical factors in the development of atherosclerosis. In order to circulate cholesterol through the body via the blood stream, the body wraps the cholesterol in special protein packages to form a substance known as a ***lipoprotein*** (*lipo* is a generic term for fat and fat-like substances.) Not all of these lipoprotein packages are alike and each serves a very different purpose.

Upon manufacture in the liver, cholesterol is picked up for circulation by ***Low Density Lipoprotein*** (from here on referred to as ***LDL***.) The low density label describes a lipoprotein that has a high percentage of cholesterol and a low percentage of protein, thus making it less dense. If more cholesterol is available than is needed by the body, then the LDL sometimes deposits excess cholesterol onto the walls of the coronary arteries (for reasons unknown). LDL is often referred to as the 'bad' type when discussing cholesterol, which may have a ring of truth to it, but keep in mind that it does play an important function in that it carries cholesterol to needed sites in the body. A high number of LDL molecules in the blood means more cholesterol is picked up, and more is then deposited in the arteries. *An easy way to remember that an excess of LDL is not desirable is to think of the 'L' in LDL as referring to a 'lazy' molecule that just lays around and clogs up everything*!

A different lipoprotein, ***High Density Lipoprotein*** (called ***HDL*** for short) performs the opposite task of LDL. 'High density' refers to the high amount of protein in relation to a smaller amount of cholesterol. HDL floats through the bloodstream, picks up excess cholesterol, and delivers it back to the liver. Here the cholesterol is repackaged as needed into lipoproteins and the excess is processed for excretion from the body. Considered the 'good' kind of cholesterol, HDL can actually remove cholesterol that has been deposited onto arterial walls, thus reducing the build-up that might occur from excess cholesterol in the system. *To remind yourself that high levels of HDL are beneficial, think of the 'H' in HDL as 'helpful'!*

TIP: Guess what increases HDL? Exercise!!!

Desirable Cholesterol Levels

A simple blood test can indicate the amount of cholesterol present in your blood. The most accurate test requires a 12-hour fast prior to taking the test. Ideally, the results should report the total cholesterol level as well as a breakdown into separate LDL and HDL counts. The quick finger-prick test available at the local mall may not give a very accurate reading (because you haven't fasted) and probably won't separate the results into LDL and HDL readings, but can give you a broad idea of your cholesterol count. Should you do the quick test and get a result that reflects high cholesterol, go get an accurate blood test! You can get tested for a minimal charge at the Grossmont College Health Office, located on campus in the east end of Griffin Center.

Cholesterol – What your numbers mean	
Desirable	< 200 mg/dL
Borderline	200-239 mg/dL
High	240 mg/dL or higher
HDL Cholesterol	≥ 60 mg/dL is desirable
LDL Cholesterol	< 100 mg/dL

3) National Cholesterol Education Program. 2004. NIH

Scientists have found the optimal TC (total cholesterol) measurement to lie between 160 and 180 for good health and low risk of heart disease. Research has shown that individuals with cholesterol levels over 265 had four times the risk of heart disease than those with levels under 180. In 2010, over 13% of American adults had cholesterol above 200 mg/dL, and 21.3% had a HDL level of less than 40 mg/dL. The good news is, due to increased awareness, these percentages have greatly reduced since 1999!

As you remember, the HDL carries cholesterol away from the arteries, so it makes sense that the higher the concentration of HDL, the lower your risk of atherosclerosis. Studies show those with a high HDL count suffer significantly fewer heart attacks than those with low HDL. An HDL of less than 40 mg/dL is considered a risk factor for heart disease. The measure of HDL is often expressed in a ratio of total cholesterol to HDL, with the recommended level being 3:1.

Factors Affecting Cholesterol Level

Heredity

Your genetic makeup is a major factor. Some studies have found families with fairly low cholesterol levels and high HDL counts, regardless of their diets. Other families had very strict low cholesterol/low fat diets and extremely high cholesterol levels—a genetic trait (their genetic blueprint includes a liver designed to generate lots of cholesterol!). If you have a history of heart disease in the family, you owe it to yourself to get a cholesterol check to see if you are at risk. Total cholesterol tends to increase with age, so just because you have a favorable count at this point doesn't mean you can ignore fat and cholesterol intake in your diet. Be good to yourself now, and help insure the quality of your life as you grow older.

Saturated fats

As a reminder, most saturated fat in our diet comes from meat, palm and coconut oil found in processed foods, and dairy products. Saturated fat is usually solid at room temperature although some liquid vegetable oils (palm oil and coconut oil) are saturated as well.

Eating excess saturated fat **raises blood** cholesterol levels, yet scientists are unable to determine why this occurs. Research does show a clear link between a diet high in saturated fat and elevated cholesterol levels. When advertisers claim their product has no cholesterol, the item may still contain saturated fat. Margarine is a good example - many now advertise that their margarine contains no cholesterol (but does contain saturated fat!)

Unsaturated fats

The two unsaturated fats (polyunsaturated and mono-unsaturated) have been associated with **lower** blood cholesterol levels. Polyunsaturated and mono-unsaturated fats come from vegetable sources and are liquid at room temperature. In addition to containing no cholesterol, these fats do not raise cholesterol in the body as do their saturated counterparts. Unsaturated fats may act to lower cholesterol by increasing HDL.

Tip: Great sources of monounsaturated fats are avocado, olive oil, canola oil, peanut oil, sunflower oil and sesame oil. Other sources include peanut butter plus many nuts and seeds.

Regular aerobic exercise

Exercise has emerged as a favorable factor in **increasing HDL** (helpful cholesterol) levels in the bloodstream. In a study conducted at Stanford University, scientists found that long distance runners had amazingly high levels of HDL and significantly lower counts of LDL when compared to the national average. Another study showed that when a group of students began a regular aerobic exercise program, their HDL levels began to rise after only seven to ten weeks. Since aerobic exercise can increase HDL which maximizes the body's ability to get rid of cholesterol, it is important to stick to your aerobic exercise program!

Healthy Eating

Evidence clearly shows that a low cholesterol/low fat diet can reduce the risk of heart disease by helping keep cholesterol levels to a minimum. Avoid eating an excessive amount of animal products, and cut down on the amount of saturated fat you eat. Read labels of all packaged foods you purchase, looking to see if the fat contained in the product is saturated or unsaturated.

Tip: The regenerative effects of exercise won't necessarily negate other poor habits, for example, unhealthy eating. Food is the fuel for the body – make sure you are running on high quality fuel.

Blood Pressure

A term referring to the pressure or force of blood in the arteries, ***blood pressure*** is expressed as a ratio, for example 118/72. ***Systolic blood pressure*** (118-first or top number) is the pressure when the heart beats, ejecting blood out of the heart so you can see why it needs to be high! ***Diastolic blood pressure*** (72-bottom number) is the pressure when the heart is relaxing and filling up with blood to get ready for the next contraction. Elevated blood pressure is termed ***hypertension*** and can only be diagnosed by a physician. The exact cause of most cases of hypertension is unknown, but researchers do know how to control it.

Blood pressure can be lowered by making the following changes:

- Reduce body fat
- Eat low fat, low sodium, & low transfat foods
- Limit alcohol intake (1=women, 2=men/day)
- Perform regular aerobic exercise
- See your doctor for possible medications

Note: According to the Mayo Clinic, 77% of our sodium intake is from processed and prepared foods! The recommended amount of sodium per day is <2400 mg, yet the average American consumes 4000 mg! If you consume too much sodium, your kidneys can't eliminate the excess so the sodium starts to accumulate in the blood. Because sodium attracts and holds water, your blood volume increases. Increased blood volume, in turn, makes your heart work harder to move more blood through your blood vessels, increasing pressure in your arteries, thus, high blood pressure!

Blood Pressure Classification for Adults over 18 yrs			
Category	**Systolic**		**Diastolic**
Normal	< 120	and	< 80
Prehypertension	120-139	or	80-89
Hypertension			
Stage 1	140-159	or	90-99
Stage 2	160 & up	or	100 & up
4) JNC7. National High Blood Pressure Education Program. 2003.			

Smoking

Although the use of smoking tobacco is widely known as a dangerous and unhealthy activity, many people are really unaware how it effects the body and the role that exercise can play in helping to stop smoking. Did you know that smokers are 2-4 times more likely to develop heart disease than nonsmokers and 2-3 times more likely to die from it?

Smoking damages the brain, heart and arteries—creating little nicks in the arterial lining, making it easy for cholesterol to attach and form plaque, which increases the likelihood of clot formations when the plaque breaks off. It elevates blood pressure and resting heart rate, making the heart work harder and increasing wear and tear. Smoking decreases the amount of oxygen carried by the blood by increasing carbon monoxide levels. It also decreases HDL levels.

Exercise can help to exchange the unhealthy habit of smoking for a healthier one. It can help to reduce the weight gain that is sometimes associated with smoking cessation. Getting in the exercise habit also helps to find other non-smokers to hang out with, rather than being tempted by smoking environments. Physical activity improves mood, reduces depression, decreases stress, and controls appetite!

Obesity

The National Institute of Health (NIH) reports that two-thirds of American adults are overweight or obese. In the history of human beings, we have never seen so many people carrying so much excess body fat – we've reached epidemic levels! Because most humans aren't biologically built to store so much body fat, chronic conditions ensue such as increased risk for heart disease, hypertension, diabetes, some types of cancer, arthritis, and other musculoskeletal problems. Obesity (BMI $\geq$ 30) and overweight (BMI $\geq$ 25 to <30) can be prevented and reduced through regular exercise and a healthy eating plan.

Diabetes

When you eat food, the digestive system breaks it down into its smallest components and then transports the molecules (i.e. glucose) via the blood. ***Insulin*** is a hormone that signals cells to absorb glucose (blood sugar) for energy usage or storage. People with ***Type 1*** diabetes do not make enough insulin so their cells can't absorb sugar/glucose (they need to inject insulin into their system.) ***Type 2*** diabetics can produce enough insulin but their system has developed ***insulin resistance***, which occurs when the cells don't recognize

insulin, thus, blood glucose levels stay high. Insulin resistance is caused by excess body fat, inactive lifestyle, and a high-processed carbohydrate diet. Exercise is an essential tool for diabetes management and prevention.

Metabolic Syndrome

Metabolic Syndrome is a serious health condition that is actually a group of risk factors in an individual. (Having several overlapping factors greatly increases the possibility of heart disease.) These risk factors include:

- Obesity
- Having insulin resistance
- Leading a sedentary (inactive) lifestyle
- Genetic factors
- High blood pressure
- Low HDL level
- Elevated triglyceride level

Current estimates are that ¼ of adult Americans have metabolic syndrome, and it is strongly associated with central (abdominal) obesity and insulin resistance. As you likely have figured out, regular exercise and healthy eating can help to decrease body fat, and enhance insulin usage.

As you can now see, regular exercise really is medicine for the body and mind – if it could be packaged in a pill most people would take it daily! If you were to ask exercisers why they stick with their fitness plan, most would say that they like how they feel afterwards . . . they feel better! Regular exercisers aren't looking for a quick fix or a magic pill because they don't need it. An active, healthy lifestyle is a process and the effects are far-reaching.

You now have more tools—knowledge and strategies—that can help you maximize your fitness and health.

By applying these basic principles and concepts to your daily life, you will add years to your life and life to your years! **Good luck from the faculty in the ESW Department!**

If you would like more information about health and nutrition, visit our department webpage at http://www.grossmont.edu/es and click on the link to ***Health-related web links***.

Internet Links

- Fitness News You Can Use from ACSM: http://www.acsm.org/AM/Template.cfm?Section=ACSM_Fit_Society_Page
- Basic Anatomy (body parts and how they work): http://www.getbodysmart.com/
- Exercises You Can Do At Home: http://www.sparkpeople.com/resource/exercises-printable.asp
- Weight Training Video Demonstrations: http://www.nsca-lift.org/videos/displayvideos.asp
- Back Health Exercises: http://www.yourbetterback.com/CoreStabilizationHealthyLowerBack.pdf
- Injury Prevention & Self-Treatment Strategies:
  - http://www.runnersworld.com/topic/0,7122,s6-241-286-0-0,00.html
  - http://www.nismat.org/ptcor
- Nutrition & Performance:
  - American Dietetic Association: http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/nutrition.html
  - Glycemic Index: http://www.glycemicindex.com
  - Calorie.king: http://www.calorieking.com/

EXERCISE IS MEDICINE!

REVIEW QUESTIONS

You should be able to answer these questions after reading this booklet.

1. What is physical fitness? Define each of the components.
2. Describe what F.I.T.T. stands for and why it is important in the development of any component of physical fitness.
3. List some of the benefits associated with increased physical fitness.
4. What types of activities promote cardiovascular fitness? Muscle strength and muscle endurance?
5. What is Target Heart Rate (THR) and what is its purpose?
6. What does the term 'overload' refer to, and what does it have to do with fitness?
7. What are the 6 essential nutrients and their functions? Which nutrient is the body's primary and most efficient fuel source? List a few healthy examples of this fuel source.
8. Although dietary fats are necessary and important, discuss why an excess of fat intake may pose problems.
9. Why should someone be concerned with losing body fat instead of body weight?
10. Explain why fasting or not eating is an inappropriate way to reduce calories.
11. What is the Set Point Theory? What types of things might your body do to try to maintain its set-point?
12. What is the most effective way to lose body fat and keep it off? What is a safe amount of fat to lose in one week?
13. What happens when someone takes in very few calories in an attempt to lose weight? How can this undermine their goal of reducing the amount of body fat they have?
14. Approximately what percentage of your diet should be comprised of carbohydrate, protein and fat? List a few common sources of each of these nutrients.
15. Be prepared to discuss the "*Choose My Plate"* version of the food pyramid; identifying food balance and where each nutrient belongs.
16. What is cholesterol and its functions in the body? Where does cholesterol come?
17. Why is cholesterol a potential problem if you have too much of it?
18. Discuss the two most common types of cholesterol packages and their impact on cardiovascular health.
19. How can you increase HDL and why would you want to?
20. What effect does saturated fat in your diet have on cholesterol?

Name: Due Date: Class:

"CHOOSE MY PLATE" ASSIGNMENT

Follow the ***EXACT*** steps below:

1. On the internet, go to: **www.choosemyplate.gov**
2. Click on "Interactive Tools"
3. Click on "Super Tracker"
4. Click on "Create Profile"
5. Submit Profile
6. Click on "My Plan" located on the top of the page.
7. Answer the following questions:
   a. How many calories per day did it calculate for you? _____calories
   b. What were your recommended daily intake amounts for:
      - ☐ GRAINS _____ ounces
      - ☐ VEGETABLES _____ cups
      - ☐ FRUITS _____ cups
      - ☐ DAIRY _____ cups
      - ☐ PROTEIN _____ ounces
8. Print out the page and attach it to this assignment to turn in.
9. Click on ***"See More Examples"*** for each food group.
10. On the page that pops up, click on ***"What counts as a serving equivalent"-*** expand the tab for more specific information on serving sizes for that food group.
11. Repeat for each food group.
12. ***Your Specific Menu for One Day:*** Complete your *Specific Menu below* by using the charts on the "My Plate" website for each food group. Choose what actual foods and amounts ***you*** would consume ***to meet your daily recommendations*** in each category (no more or no less). Attach the page from the website you were asked to print out in step 6.

GRAINS: Recommended ounces =_____
List specific foods: Amount

FRUIT: Recommended cups=_____
List specific foods: Amount

DAIRY: Recommended cups=_____
List specific foods: Amount

VEGETABLES: Recommended cups =_____
List specific foods: Amount

PROTEIN: Recommended ounces=_____
List specific foods: Amount

*Calculating Your Resting Metabolic Rate and Calorie Needs (based on Harris-Bendedict Equation)**

Women

1. Begin with a base of 655 calories 655_____
2. Multiply your weight in pounds X 4.3 _____
3. Multiply your height in inches X 4.7 _____
4. Add together the totals from #1, #2, and #3 _____
5. Multiply your age X 4.7 _____
6. Subtract result of #5 from total of #4 _____ (**your RMR**)
7. Multiply #6 by your activity factor** _____(your daily maintenance calories)
8. Subtract 250-500 calories _____ (your daily calories for weight loss)

Men

1. Begin with a base of 66 calories _____
2. Multiply your weight in pounds X 6.3 _____
3. Multiply your height in inches X 12.7 _____
4. Add together the totals from #1, #2, and #3 _____
5. Multiply your age X 6.8 _____
6. Subtract result of #5 from total of #4 _____ (your RMR)
7. Multiply #6 by your activity factor** _____ (your daily maintenance calories)
8. Subtract 250-500 calories _____ (your daily calories for weight loss)

For Activity, multiply:
RMR times 1.2 for extremely low levels of activity (sedentary/little to no exercise)
RMR times 1.3 for light physical activity (2-4 hours/week)
RMR times 1.4 for moderate physical activity (4-7 hours/week)
RMR times 1.6 for high levels of activity (regular exercise or manual labor)
RMR times 1.9 for extra active (very hard exercise/sports and physical job or 2x training)

*Formulas are not 100% accurate. They are to be used as a guide. One important issue to note is that people often overestimate their physical activity level. However, formulas are a good place to start. Make sure to stay above your RMR and never consume less than 1200 calories unless under medical supervision.

Name: Due Date: Class:

CALCULATING THR ZONE ASSIGNMENT

I. To calculate your Target Heart Rate Zone you need the following information first:

1. Your age: _____ (ex. Luis is 40 years old)

HRrest = _____bpm

2. Your **Resting Heart Rate (HRrest):**

   Measure your resting heart rate for 30 seconds (be sure you are truly at rest and have been there for awhile).

   _____ X 2 = _____ (ex. 36 x 2 = 72 bmp is Luis' resting heart rate)

   30 sec count HRrest

3. Your **Estimated Maximum Heart Rate (HRmax):**

   206.9 – _____ = _____ (ex. 206.9 – (.67 x 40)

   (.67x Age) HRmax 206.9 –26.8=180.1 bpm is Luis' HRmax

HRmax = _____ bpm

4. Your **Intensity Range in <u>Decimal</u>:**

   a. Choose one of the three intensities appropriate for you by using the following guidelines:

   - ☐ Those with health issues (Zone 1 - low intensity):THR Zone: 40% - 60%
   - ☐ Beginning/intermediate/average exercisers (Zone 2 – moderate intensity): THR Zone: 60-75%
   - ☐ Physically fit individuals (Zone 3 – high intensity): THR Zone: 70%-85%

   b. Convert the range to decimal (ex. 60%-75% in decimal is .60-.75). The first number is the low end of your intensity range and the second number is the high end of your intensity range.

   (Ex. Luis is an average exerciser so he will choose 60%-75% or in decimal, .60 - .75)

   ._____(Low End of Intensity Range to)._____ (High End of Intensity Range)

II. You will now calculate the low and high end of your Target Heart Rate Zone using the above information and the **THR Zone Formula**: (Intensity in decimal form) (HRmax – HRrest) + HRrest.

Low End of your Target Heart Rate Zone:

= (Low End of Your Intensity Range in decimal form) (HRmax – HRrest) + HRrest

= (_____) (_____ – _____) + _____ [ex. (.60)(180.1-72) + 72

= (_____) (_____) + _____ (.60) (108.1) + 72

= _____ + _____ 64.86 + 72

= _____ bpm 136.86 bmp

High End of your Target Heart Rate Zone:

= (High End of Your Intensity Range in decimal form) (HRmax – HRrest) + HRrest

= (_____) (_____ – _____) + _____ [ex. (.75)(180.1-72) + 72

= (_____) (_____) + _____ (.75) (108.1) + 72

= _____ + _____ 81.08 + 72

= _____ bpm 153.08 bmp

My Target Heart Rate Zone is _____ to _____ bpm (ex. Luis' THR Zone is 138.9 to 153.1 bpm)

THRZone for a 6 second count: _____to _____ (divide each of the above numbers by 10)

(Ex. When counting for 6 seconds, Luis' THRZone should be between 13.9 to 15.3)

THRZone for a 10 second count: _____to _____ (divide each of the above numbers by 6)

(Ex. When counting for 10 seconds, Luis' THRZone should be between 23.2 to 25.5)

F.I.T.T. Summary Grid

This grid provides a summary of the minimum values for making the most of your exercise program!

COMPONENTS OF PHYSICAL FITNESS	***FREQUENCY***	***INTENSITY***	***TIME***	***TYPE***
CARDIORESPIRATORY ENDURANCE (CRE)	3x/week	▪ Talk Test ▪ RPE Scale ▪ THR Zone	20 minutes	Aerobic activities: i.e. brisk walk, swim, run, hike, bicycle, dance, jump rope. Interval activities are okay!
MUSCULAR STRENGTH & ENDURANCE (MSE)	2 x/week	*Generally*: Muscle fatigue *Circuit*: 40-70% 10RM	*Generally*: 1-2 sets of 8-12 reps *Circuit*: 30-45 seconds	Weight training, body weight exercises, tubing, other resistance material
FLEXIBILITY (FLEX)	3x/week	Point of tension	Dynamic: 10 reps Static: >10 seconds Contract/Relax: 5 seconds each	▪ Dynamic for warm-up ▪ Static for cool-down ▪ Contract /relax
BODY COMPOSITION (BC)	5-7 x/week	• Moderate intensity initially • Gradually progress to higher intensity	45-60 minutes (200-300 minutes/week)	↑**calories used** (via general physical activity & planned exercise) and ↓ **calories in** (food portion & healthy choices). Create negative energy balance of 500-1000 kcal/day to ensure weight loss of 1-2 lbs/week.

10 Second Heart Rate to BPM Conversion Chart

(Exercise HR x 6 seconds = beats per minute)

HR for 10 sec	BPM		HR for 10 sec	BPM
8	48		21	126
9	54		22	132
10	60		23	138
11	66		24	144
12	72		25	150
13	78		26	156
14	84		27	162
15	90		28	168
16	96		29	174
17	102		30	180
18	108		31	186
19	114		32	192
20	120		33	198

Tanita Body Composition Analyzer Printout

A bioelectric impedance analyzer uses a minor electrical current to measure electrical resistance. The amount of electrical resistance is related to the amount of fat-free or lean body mass within the body. Muscle tissue acts as a conductor of the electrical current (due to its high water content); adipose or fat tissue acts as a resistor.

Fat% = Percentage of total body weight that is fat

BMR = Basal Metabolic Rate is the total energy expended by the body while at rest. In other words, it is the amount of calories needed by the body to maintain normal functions at rest, such as respiration, circulation, and maintaining body temperature. BMR is measured in kilocalories. This is only an estimated BMR measurement based on a calculation using your gender, height, weight and age.

Impedance = Resistance or impedance is measured in ohms (one ohm is the resistance value through which one volt will maintain a current of one amp.)

FFM = Fat Free Mass is lean body tissue which includes bone, muscle, organs, water and all other fat free mass in the body.

TBW = Total Body Water is the amount of water retained in the body. Water comprises between 50-70% of total body weight. Generally, men have a higher water weight than women due to greater amounts of muscle tissue.

Target Body Weight Calculation

1) Current body weight (lbs) x current percent fat in a decimal = fat weight (lbs)
2) Body weight – fat weight = fat free weight (lbs)
3) Fat free weight ÷ (1 – desired percent fat in decimal form) = body weight at desired percent fat

For example: 150 lb person who is currently 30% fat and wants to take steps to be 22% fat:

150 lbs x .30 = 45 lbs *150 – 45 lbs = 105 lbs* *105 lbs ÷ (1 - .22) = 134.6 lbs*

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