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3rd Edition

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Objectives of Personal Training

➤ Definition of Personal Training

A fitness training program that joins a personal trainer with a client to establish a mutual, respectful, and beneficial partnership in order to reach a particular fitness/health goal.

Definition of Personal Trainer

A personal trainer is a qualified fitness professional hired by a client to assist the client in reaching a particular fitness/health goal.

Purpose of Personal Training

- Assess client's current level of fitness and assist in setting fitness goals based on assessment.
- Design and implement an individualized program for a client.
- Counsel client on healthy living through nutrition and fitness activities.
- Motivate client to live a healthy lifestyle and to reach fitness goals.

➤ Benefits of Personal Training

- Receive baseline information through fitness assessments
- Individualized fitness program and attention
- Tracking method of progress
- Motivation
- Efficient workout sessions
- Directs beginners down the correct path from the very beginning to avoid developing bad habits
- Accountability for the client
- Improve technical skills
- Overcome plateaus
- Better assurance of a safe workout
- Better assurance of reaching fitness goals with more guidance
- Special attention can be directed towards specialized conditions such as arthritis, osteoporosis, injury, etc.
- Some personal trainers will do house-calls....working out at home
- A good personal trainer will empower a client to be able to work out on his/her own

➤ Qualifications of a Personal Trainer

- Education
 - o Current nationally recognized personal trainer certification
 - o Some formal education in physiology, kinesiology/biomechanics, anatomy, and health promotion
 - o CPR/First Aid
 - o A personal trainer should continue his/her education through workshops, reading, and networking
- Liability Insurance—All personal trainers should carry liability insurance.
- Business License—Check with your city or town to determine if a business license is required to do business as a personal trainer.

➤ **Responsibilities of a Personal Trainer**

What a personal trainer IS and DOES:

- An efficient communicator
- An active listener
- A motivator
- Knowledgeable in the areas of the components of fitness
- Professional
- Punctual
- Organized
- Educated/Certified
- Experienced
- Marketing and promotion
- Well-groomed
- A role model
- Positive
- Follows industry guidelines
- Provides documented policies that describe services, prices, cancellation, contract length, etc
- Assesses the client
- Prescribes a safe and specific fitness program especially designed for each client
- Counsels and educates the client on important health and fitness topics
- Focuses on the goals established
- Tracks the progress of the client
- Follows up with client
- Refers client to other professionals to handle situations out of his/her scope of practice
- Empowers the client—An effective personal trainer trains the client to need the personal trainer for only a set period of time

What a personal trainer IS NOT and DOES NOT DO:

- Act as a medical professional—Unless they do indeed have the formal education
- Doctor, physical therapist, psychologist, registered dietician
- Dismiss questions or concerns
- Rush through appointments or workout sessions
- Recommend fad diets
- Recommend questionable supplements, ergogenic aids, or herbs
- Recommend a “quick fix” program
- Push client to the point of pain or injury
- Fail to recommend a comprehensive fitness program
- Engage in full conversations with other people during a client’s training session
- Fail to return phone messages or e-mails

➤ **Responsibilities of a Client**

- Ultimate responsibility to follow the exercise prescription designed by the personal trainer lies with the client.
- Ask the personal trainer questions regarding qualifications, policies, and procedures.
- Be prepared to provide the personal trainer with specific goals.
- Write down questions prior to the session.
- Follow exactly what the personal trainer prescribes to insure better success.
- Communicate likes and dislikes regarding exercise preference.
- Communicate to the personal trainer if he/she is being pushed way beyond limits.
 - A little discomfort is good but pain is not acceptable.
- Immediately address problems with personal trainer.
- Avoid placing unrealistic expectations on the personal trainer. The trainer provides the plan but cannot do the exercises, dieting, and healthy living for the client.
- Wear proper clothing during the personal training session.
- Bring a towel and water to the personal training session.
- Call at least 24 hours in advance to cancel a session.
- Avoid idle chit-chat during a session.

➤ **Job Opportunities for a Personal Trainer**

- Private/Local Clubs
- Community Centers
- Corporations
- Cruises
- Resorts
- Mobile Personal Training
- Own Personal Training Studio
- Athletic Coaching
- Consulting



Below are a series of questions designed to help you efficiently remember the course material. Before proceeding to the next page of the course content, please answer the following review questions.

Section #1 Review Questions

1. List and describe five benefits of hiring a personal trainer.
2. List five actions a personal trainer takes and five actions a personal trainer avoids in an effort to convey professionalism to a client.

Case Study: John has been working part-time as a certified personal trainer for a little over 30 days at a large health club in his town. John's full-time employment is as a high school football coach. He has extensive experience and knowledge in strength training for high school athletes. Sue Ann, a friend of John's mother is a 70-year-old woman who has osteoporosis. John's mother suggests that Sue Ann contact John to schedule an appointment to discuss her doctor's suggestion that she work with a personal trainer to improve the strength of her core and postural muscles.

From the list below, select the best course of action for John to take in respect to personal training Sue Ann:

_____ Refer Sue Ann to Megan, a certified personal trainer at the club who has been Pilates certified for 10 years. Megan specializes in working with clients who have spinal issues.

_____ Sell Sue Ann 12 training sessions for 4 weeks of training/3 days a week to implement a strength training program using the machines in the weight room.

_____ Advise Sue Ann that he would like to train her and schedule the first appointment with Sue Ann for the following week. After meeting with Sue Ann, John seeks advice from Megan on best course of action to take with Sue Ann and does research on the internet to find safe and effective ways to work with a 70-year-old female with osteoporosis. He goes to the fitness director's library and finds a book that has specific information on training older women. John creates a program for Sue Ann which he asks both Megan and the fitness director to review and provide feedback.

Briefly explain why this is the best course of action for John:

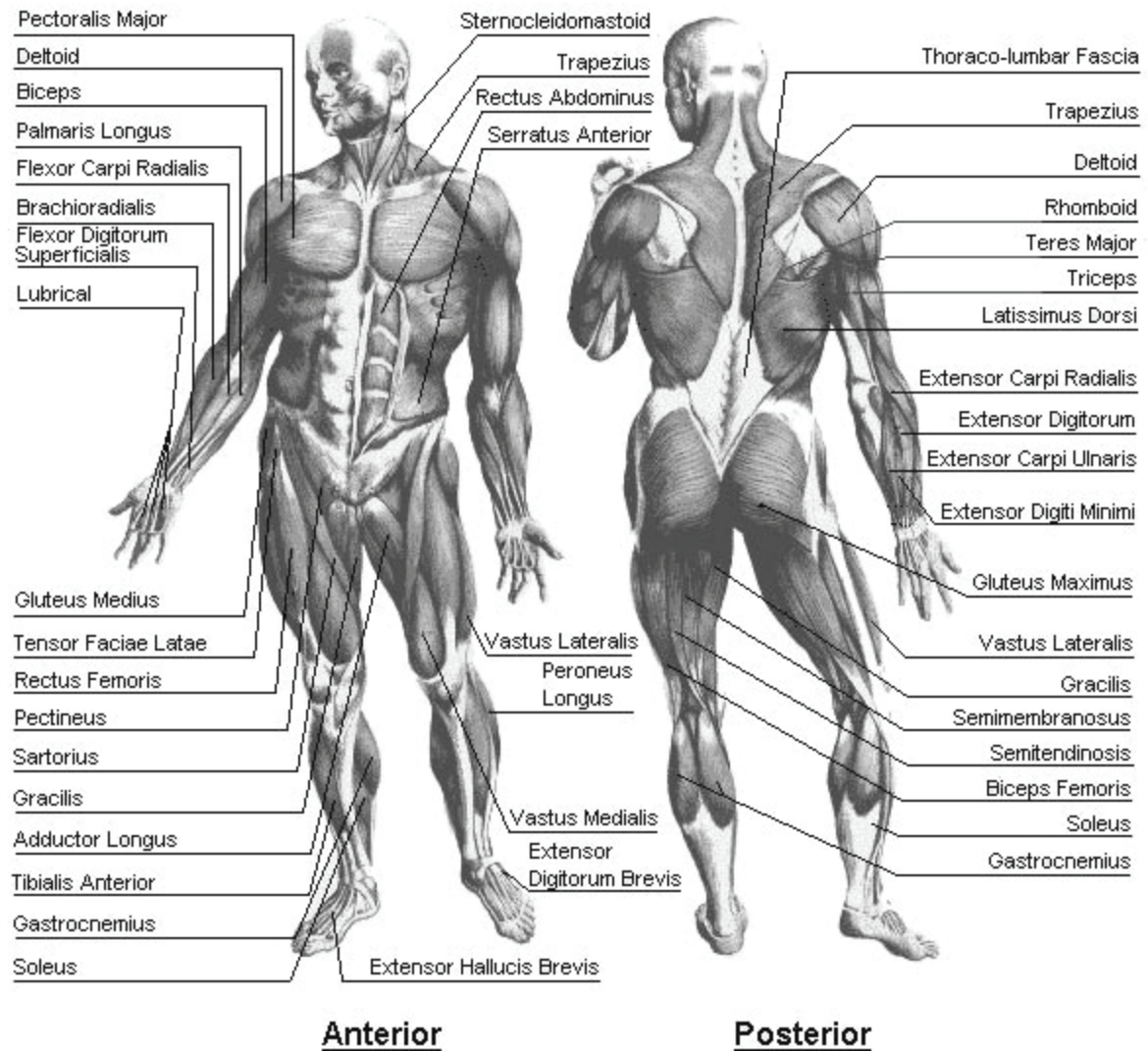
Exercise Science

➤ Anatomy

Definition: The structure of the human body

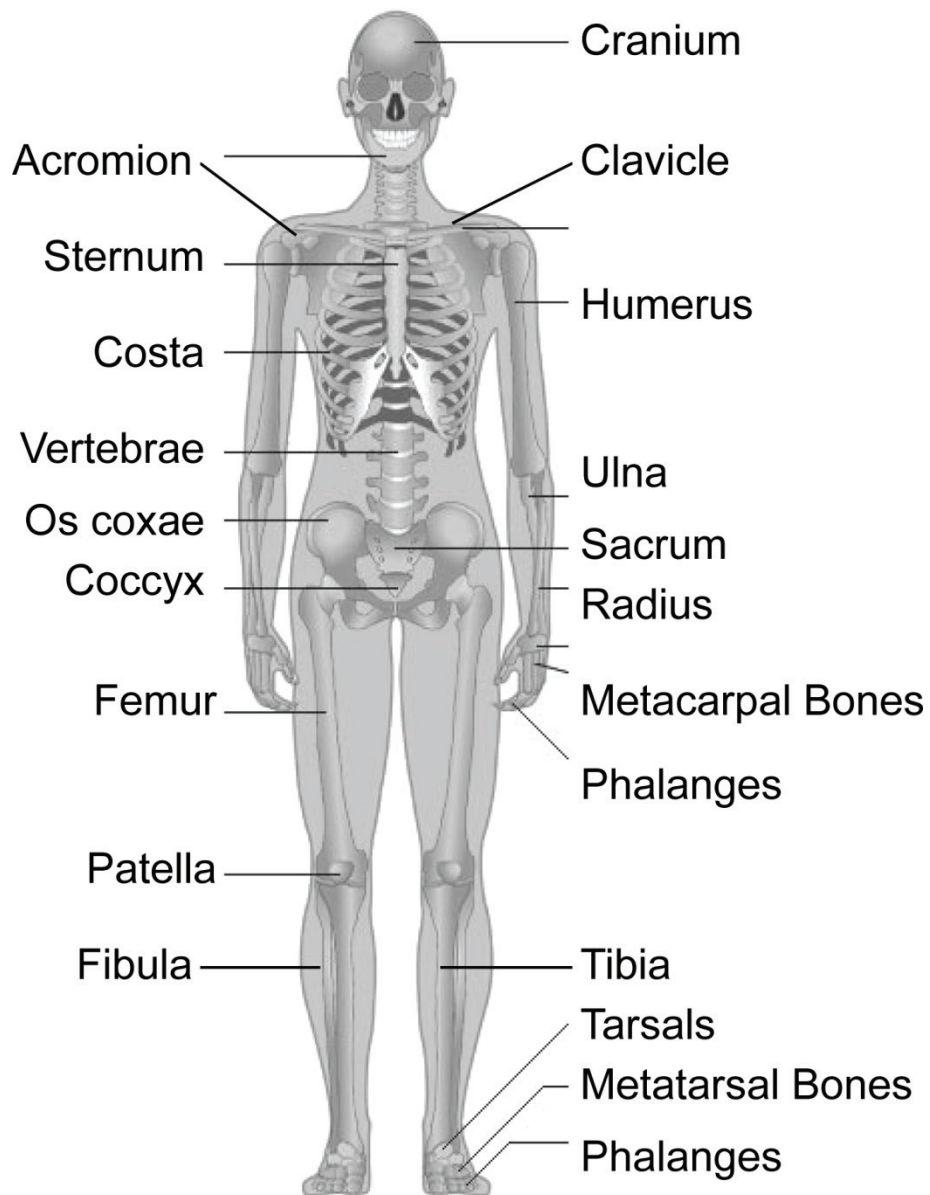
- **Striated or Skeletal Muscle:** The anatomical structure that provides the force necessary to move the body
- **Myology:** The study of muscles

Muscular Anatomical Figure



- **Bone:** The anatomical structure that provides support, movement, and protection for the body
- **Osteology:** The study of bones

Skeletal Anatomical Figure



- **Joint:** The point at which two or more bones come together or make contact
- **Arthrology:** The study of joints
- **Articulation:** Movement at a joint
 - o **Diarthrodial Joint or Diarthrosis (Moveable Joints):** A joint that has an articular cavity or separation present to allow movement
 - **Five Characteristics of Diarthrodial Joints**
 - Articular cavity present
 - Surrounded by a capsule ligamentous
 - Capsule ligamentous is lined with synovial membrane which secretes synovial fluid to lubricate the joint with synovial fluid stored in bursa sac
 - The articular surfaces are smooth
 - Articular surfaces are lined with hyaline or fibrous cartilage
 - **Sub-classes of Diarthrodial Joints and Examples**
 - Irregular: carpals and tarsals
 - Hinge: humerus and ulna
 - Pivot: humerus and radius
 - Condylloid (True Wrist): radiocarpal (joint of the wrist)
 - Saddle: first carpometacarpal (joint of the thumb)
 - Ball & Socket: shoulder and hip
 - o **Synarthrodial Joint or Synarthrosis (Non-Moveable Joints):** A joint that does not have an articular cavity or separation present to allow movement
 - **Three Characteristics of Synarthrodial Joints**
 - The joint surface continues with cartilage of fibrous cartilage
 - The joint may not be a true joint, just a ligamentous connection
 - There is no capsule ligamentous, synovial membrane, fluid, bursa sac, nor articular surface
 - **Sub-classes of Synarthrodial Joints**
 - Cartilaginous: Disks between the vertebrae of the spine
 - Fibrous: The sutures of the skull or the connecting points of the six bones in the pelvic girdle
 - Ligamentous: Mid-union of the forearm between the ulna and radius

➤ Physiology

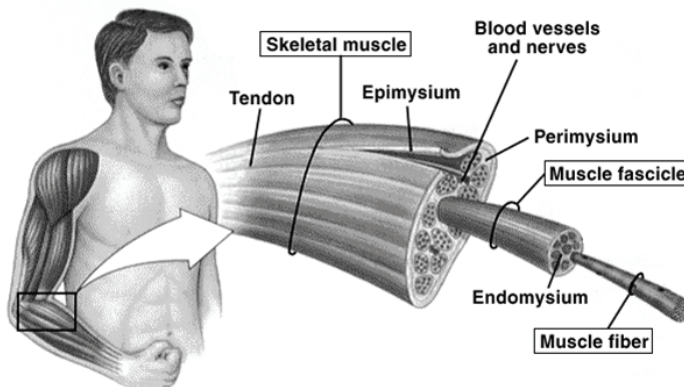
Definition: Physiology is the study of human body function.

Three Types of Muscles in the Body

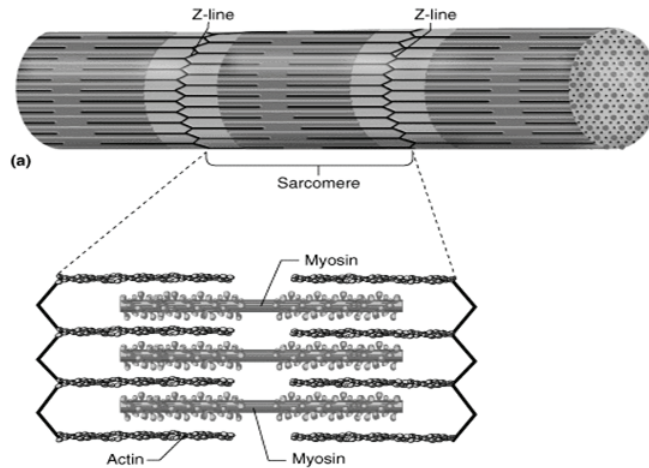
- **Skeletal (Striated):** Skeletal muscles connect to the bones. There are approximately 400 skeletal muscles in the body.
 - About 40% of body weight comes from skeletal muscles.
- **Smooth:** These muscles line the blood vessels and the gastrointestinal and urinary tracts.
- **Cardiac:** The cardiac muscle is the heart.

Structure of the Skeletal Muscle

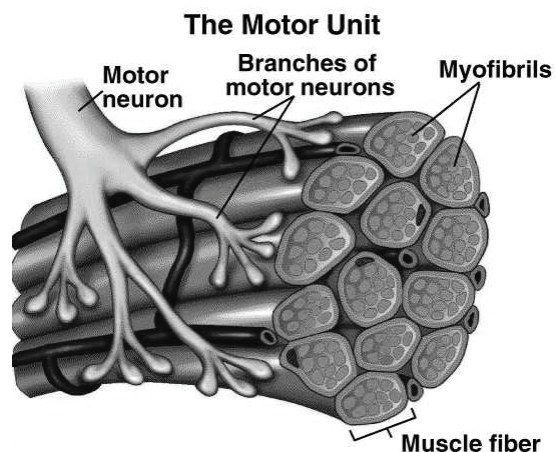
- Each muscle contains three layers of connective tissue:
 - **Epimysium:** located in the outer layer of the muscle
 - A dense layer of collagen fibers that surround the entire muscle and which separate the muscle from surrounding tissue and organs
 - **Perimysium:** located in the center of the muscle
 - Connective tissue fibers which divide the skeletal muscle into a series of compartments which each contain a bundle of muscle fibers (fascicle)
 - Contains blood vessels and nerves which maintain blood flow and innervate the fascicle
 - **Endomysium:** located in the inner layer of a muscle
 - Located within the fascicle and surrounds the individual muscle fibers and connects adjacent muscle fibers
- **Tendon:** Attach skeletal muscles to bones
 - Formed by the epimysium, perimysium and endomysium fibers bundling together at the end of each muscle
 - Contraction of a muscle exerts a pull on a bone or bones which results in movement



- **Myofibrils:** Microscopic proteins bundled together to form a myofibril
 - o **Sarcomere:** Housed in the myofibrils and is the fundamental unit of contraction. During a muscle contraction, the “sliding filament” theory occurs when actin (thin filament) and myosin (thick filament) slide across each other. The actin slides over the myosin pulling the ends of the sarcomere together creating a contraction and shortening the muscle.



- o **Fiber:** Myofibrils bundled together
- o **Fascicle:** Many fibers bundled together
- o **Whole Muscle:** Many fascicles bundled together
 - Allows for movement as complex as running or walking to typing on a keyboard
- o **Motor Unit:** The functional unit of muscular contraction that includes a motor nerve and the muscle fiber that its branches innervate



Muscle Contraction

- **Contraction:** A muscle action which is required for every human activity apart from thinking
 - o A contraction is initiated by impulses (action potentials).
 - o Impulses are sent through the central nervous system by way of a motor neuron (neural cell).
 - o Muscle contractions produce force through the interaction of the two microscopic proteins of actin and myosin.
- **All or None Law:** Skeletal muscles either fully contract or not at all.
 - o Partial contractions do not occur in the skeletal muscles. The amount of muscle force can vary by the number of motor units contracted during movement (exercise or activities of daily living) and due to the frequency in which the motor units are recruited.

Three Types of Muscle Contractions

- **Isotonic Contraction:** A muscle contraction in which the force of the muscle is greater than the resistance, resulting in joint movement with the shortening of the muscle. Isotonic muscle contractions are made up of two phases:
 - o **Concentric Phase:** A shortening of the muscle as a result of contraction. For example, when lifting a weight or working against resistance, the muscles will shorten and the joint angle will decrease. A bicep curl provides a good example of the concentric phase of an isotonic contraction.
 - o **Eccentric Phase:** A lengthening of muscle during its contraction which results in an increase in the joint angle. A triceps press down is a good example of the eccentric phase of an isotonic contraction. Eccentric contractions are the strongest contractions and can result in sore muscles due to the myosin pulling apart from its binding site on the actin.
- **Isometric Contraction:** A muscle contraction in which the length of the muscle is unchanged. This can be demonstrated when unsuccessfully trying to lift a weight that is too heavy or performing an exercise, such as plank, which is held for a period of time.
- **Isokinetic Contraction:** A muscle contraction performed with controlled speed, allowing maximal force to be applied throughout the full range of motion. Exercises performed in water are excellent examples of isokinetic contractions. The force required for movement is equal during movement. For example, when performing jumping jacks in the pool, the same amount of force must be applied when opening the legs out as is applied when bringing the legs together.

Three Muscle Fiber Types

There are three types of muscle fibers found in a muscle. The exact mix of fibers is genetically determined for each individual and is the reason why some clients are fast runners and why slower runners may have more endurance for longer distances.

- **Slow Twitch (Type I):**
 - o Slow twitch fibers are recruited for aerobic activity.
 - Contract slowly and are very resistant to fatigue
- **Fast Twitch (Type II):**
 - o Fast twitch muscle fibers are recruited for anaerobic activities requiring speed, power, and strength.
 - Contract quickly and fatigue easily
- **Sub-types of fast twitch fibers:**
 - o Fast Twitch A (Type IIa):
 - Represent the transition between slow twitch and fast twitch B
 - Comprised of characteristics of both endurance and power
 - Recruited for prolonged anaerobic activities
 - More fatigue resistant than fast twitch B fibers
 - o Fast Twitch B (Type IIb):
 - Recruited for short, intense activities such as short sprints and power lifting

Applying Three Muscle Fiber Types to Personal Training

The specific proportions of the three muscle fiber types in each individual vary from individual to individual and are genetically determined. The type of muscle fiber recruited for a specific activity can be trained specifically. In addition, the type of muscle fibers found in a specific muscle is dependent upon the intended function of the muscle. For example, the postural muscles (abdominal and low back) are comprised mainly of slow twitch fibers to allow for endurance of holding the torso upright.

Understanding how fast twitch and slow twitch muscle fibers react to activity will provide the personal trainer with insight into how to train a client and why each individual responds to training differently. While clients who possess a greater proportion of fast twitch muscle fibers will exhibit more speed and power than a client with a greater proportion of slow twitch muscle fibers, the client with the abundance of slow twitch muscle fibers will actually attain a higher level of muscular endurance than the client with the fast twitch fibers who can lift heavy weights for a shorter duration of time. On the other hand, the client with a prevalence of fast twitch muscle fibers will be able to run faster and perform powerful movements with greater success than the individual with a high proportion of slow twitch muscle fibers.

- **Slow twitch fiber clients:**
 - o Best suited for endurance activities, aerobic training, and muscular endurance.
 - o To train an individual with a preponderance of slow twitch muscle fibers to perform fast twitch activities, the trainer must incorporate high-intensity weight training workouts and increase the speed of the cardio workouts progressively.
- **Fast twitch fiber clients:**
 - o Best suited for activities involving speed, power, and strength.
 - o Training an individual who exhibits a high abundance of fast twitch muscle fibers for a marathon or endurance activity will involve an increase in the duration of cardio workouts and an increase in the number of repetitions performed during a weight training or resistance program.

Muscle Mass Changes from Resistance Training

- **Hyperplasia Theory:** An increase in muscle size due to muscle fibers splitting and forming separate fibers
- **Hypertrophy:** An increase in muscle size due to the cross-sectional area of the muscle increasing in size

- **Terms in Metabolic, Cardiovascular, and Respiratory Responses to Exercise**

- o **Energy:** Energy comes from carbohydrates, fats, and proteins. Energy must be converted to Adenosine Triphosphate (ATP) to be used by nerves, muscles, and other cells.
- o **Oxygen Uptake:** The rate at which oxygen is utilized during a specific level of an activity.
- o **Oxygen Deficit:** The difference between the theoretical oxygen requirement of a physical activity and the measured oxygen uptake.
- o **Steady State:** The point during exercise at which oxygen uptake is unchanging or changes very little.
- o **Oxygen Debt** or **Excess Post-exercise Oxygen Consumption (EPOC):** The amount of oxygen used during recovery from work that exceeds the amount needed for rest.
- o **VO₂max:** The greatest rate of oxygen utilization attainable during heavy work. Expressed in L-min⁻¹ or ml-kg⁻¹-min⁻¹.
- o **Heart Rate:** The number of beats of the heart per minute.
- o **Stroke Volume:** The amount of blood pumped in one beat of the heart.
- o **Cardiac Output:** The amount of blood circulated by the heart in one minute. Formula Expressed as Heart Rate x Stroke Volume = Cardiac Output
- o **Blood Pressure:** The pressure exerted by the blood on the vessel walls, measured in milliliters of mercury by the sphygmomanometer.
- o **Pulmonary Ventilation:** The process of oxygenating the blood through the lungs.
- o **Lactate Threshold (Ventilation Threshold):** The point during a graded exercise test at which the blood lactate concentration suddenly increases; a good indicator of the highest sustainable work rate.

- **Effects of Endurance Training:**

- o Increase in number of mitochondria (the “powerhouse of cells”)
- o Decreased time that it takes to achieve steady state
- o Size of the ventricle of the heart increases, increasing the amount of blood that can be pumped with one beat of the heart
- o Increased VO₂max



Below are a series of questions designed to help you efficiently remember the course material. Before proceeding to the next page of the course content, please answer the following review questions.

Section #2 Review Questions

1. On a separate sheet of paper, define the following terms:

Energy

Oxygen Debt

Stroke Volume

Lactate Threshold

Blood Pressure

Articulation

Joint

Synovial Membrane

Oxygen Deficit

Hinge Joint

Pivot Joint

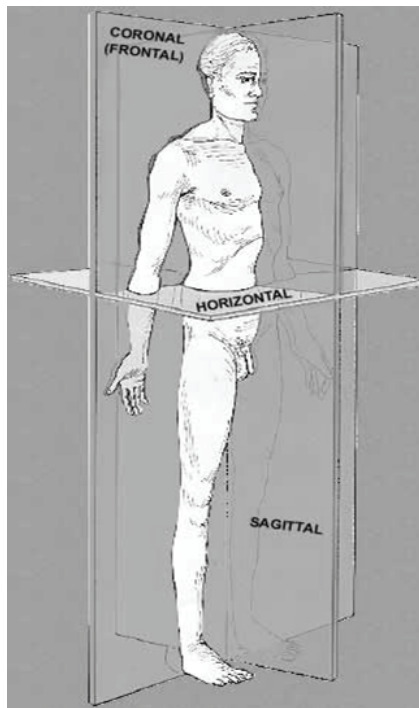
Cartilaginous Joints

2. _____ provides the force necessary to move the body and _____ provides support, movement, and protection for the body.
3. List the five characteristics of diarthrodial joints.
4. List the three characteristics of synarthrodial joints.
5. List the three muscle fiber types and understand how to practically apply knowledge of the muscle fiber types to personal training.
6. Tendons attach _____ to _____.
7. _____ is the functional unit of muscular contraction.
8. List the three types of muscular contraction and provide an example of each.

➤ Kinesiology/Biomechanics

Definition: Kinesiology is the scientific study of human movement.

- **Planes of Movement:** Flat imaginary surfaces that divide all of the body into halves in order to correspond with movement, motion, and actions. Human movement occurs in a plane of movement.
 - o **Median/Sagittal Plane:** A vertical plane that passes through the body anterior to posterior dividing the body into right and left sections. Flexion and extension movements occur within the sagittal plane.
 - o **Frontal/Coronal Plane:** A vertical plane that passes through the body from side to side dividing the body into anterior and posterior sections. Abduction and adduction movements occur within the frontal plane.
 - o **Transverse/Horizontal Plane:** A horizontal plane that passes through the body dividing the body into superior and inferior (top and bottom) sections. Rotation and twisting actions occur within the transverse/horizontal plane.



**Movement within a plane will always occur parallel to that plane.*

- **Muscle Movements/Actions**
 - o **Prime Movers (Agonist):** Muscles responsible for a definite movement of a joint.
 - o **Antagonist:** Muscles that cause movement at a joint in a direction opposite to that of its agonist.
 - o **Synergists:** Muscles that keep the joint steady while the prime mover applies force to a neighboring joint.

- **Joint Actions**

- o **Flexion:** The movement of a limb caused by concentric muscular contraction, resulting in a decrease in the angle of a joint.
- o **Extension:** The movement of a limb caused by eccentric muscular contraction, resulting in an increase in the angle of a joint.
- o **Hyperextension:** A continuation of extension past the normal anatomical position.
- o **Lateral Flexion:** Flexing to the side (Usually an action of the vertebral column).
- o **Dorsiflexion:** Flexion of the ankle joint bringing the top of the foot towards the shin.
- o **Plantar Flexion:** Extension of the ankle joint lowering the top of the foot away from the shin. The bottom of the foot lowers towards the floor.
- o **Abduction:** Within the anatomical position, movement of a bone/bones laterally away from the midline of the body.
- o **Adduction:** Within the anatomical position, movement of a bone/bones towards the midline of the body.
- o **Rotation:** Movement around an axis.
- o **Internal Rotation:** Rotation of a joint inward towards the midline of the body.
- o **External Rotation:** Rotation of a joint outwards away from the midline of the body.
- o **Circumduction:** A stationary point on a line with the distal end moving in a circle forming a cone. This is a combination of movements in all planes.
- o **Elevation:** Upward movement/action of the scapula.
- o **Depression:** Downward movement/action of the scapula.
- o **Protraction:** Abduction of the scapula.
- o **Retraction:** Adduction of the scapula.
- o **Pronation (eversion):** The positioning of the hand with the palm facing down. The inward rotational roll position of the foot.
- o **Supination (inversion):** The positioning of the hand with the palm facing up. The outward rotational roll position of the foot.
- o **Neutral Spine:** The natural inward arch of the low back which distributes load equally throughout the low back. This distribution of load helps to prevent injury and allows for efficient movement.
- o **Anterior Tilt:** An arching of the lower back that causes the pelvis to tilt towards the front of the body.
- o **Posterior Tilt:** A rounding of the lower back that causes the pelvis to tilt towards the back of the body.

- **Anatomical Directional Terminology**
 - o **Anterior:** In front or in front of the body.
 - o **Posterior:** Behind, in back, or in the rear.
 - o **Prone:** The body lying face downward.
 - o **Supine:** Lying on the back, face upward position of the body.
 - o **Midline:** An imaginary external vertical line which is used as a reference line to divide the body or body parts into left and right sections.
 - o **Lateral:** On or to the side, outside, farther from the median or midsagittal plane.
 - o **Medial:** Relating to the middle or center, nearer to the medial or midsagittal plane.
 - o **Proximal:** Nearest the trunk or the point of origin.
 - o **Distal:** Situated away from the center or midline of the body, or from the point of origin.
 - o **Superior (Supra):** Above in relation to another structure, higher.
 - o **Inferior (Infra):** Below in relation to another structure, lower.
- **General Biomechanical Concepts**
 - o **Stability:** The ease at which balance is maintained. Stability is greater when the center of gravity is closer to the ground and the support base is as wide as possible.
 - o **Rotational Inertia:** Reluctance to rotate; proportional to the mass and distribution of the mass around the axis.
 - o **Torque:** The effect produced by a force causing rotation; the product of the force and length of force arm (perpendicular distance from the axis).
 - o **Angular Momentum:** The quantity of rotation. Angular momentum is the product of the rotational inertia and angular velocity.
- **Newton's Three Laws of Motion**
 - o **Inertia:** An object at rest will remain at rest and an object in motion will remain in motion unless acted upon by some external force.
 - o **Acceleration:** A distance traversed per unit of time will remain constant unless a force acts upon the moving object. Acceleration is directly proportional to the force produced and inversely proportional to the mass while moving in the same direction as force is produced.
 - o **Reaction:** For every action there is an equal and opposite reaction.

Risk Factors for Coronary Heart Disease (CHD)*

- **Primary Risk Factors**
 - o Age—Men >45 years/Women >55 years
 - o Family History
 - o Smoking
 - o High total cholesterol—CHL >200 mg/dl
 - o High low-density cholesterol LDL >100 mg/dl
 - o Low high-density cholesterol HDL <35 mg/dl
 - o Hypertension (High blood pressure) - Blood Pressure >140/90
 - o Physical inactivity
 - o Diabetes
- **Secondary Risk Factors**
 - o Obesity
 - o High very-low density cholesterol
 - o Inability to cope with stress
 - o African-American male
 - o Low level of cardiorespiratory fitness
 - o High fat diets
- **Major Symptoms of Cardiopulmonary Disease**
 - o Pain, discomfort in the chest, neck, jaw, arms, or other areas that may be ischemic in nature
 - o Shortness of breath at rest
 - o Dizziness
 - o Orthopnea or paroxysmal nocturnal dyspnea
 - o Ankle edema
 - o Palpitations or tachycardia
 - o Intermittent claudication
 - o Known heart murmur
 - o Unusual fatigue
- **Initial Risk Stratification**
 - o Apparently Healthy—Individuals who are asymptomatic and apparently healthy with no more than one primary coronary risk factor
 - o Increased Risk—Individuals who have signs or symptoms suggestive of possible cardiopulmonary or metabolic disease and/or two or more primary risk factors
 - o Known Disease—Individuals with known cardiac, pulmonary, or metabolic disease

FiTOUTR® recommends that individuals who are stratified within the Increased Risk or Known Disease categories should be medically examined and tested before beginning a personal training program.

**Information provided by ACSM Guidelines for Exercise Testing and Prescription.*

Section #3 Review Questions

- Flexion:

- 19

Exercise Principles

➤ Training Concepts and Terms

- **Acclimatization:** A physiological adaptation to a new environment (higher altitude, temperature, or humidity). It may take 7 to 12 days to acclimate to different environments.
- **Adherence:** A state of continuing an exercise program as prescribed.
- **Aerobic Activities:** Sub-maximal intensity activities that use large muscle groups with energy supplied in the presence of oxygen that can be performed for a long period of time.
- **Agility:** Ability to start, stop, and move the body quickly in different directions.
- **Anaerobic Activities:** High intensity activities during which energy demands exceed the ability to supply oxygen; cannot be performed for a long period of time.
- **Balance:** The ability to maintain a certain posture or to move without falling; symmetrical.
- **Conditioning:** Exercise conducted on a regular basis over a period of time ("training").
- **Coordination:** The ability to perform a task integrating movements of the body.
- **Cross Training:** Incorporating different modalities of exercise into an overall training regimen to avoid over-training, boredom, and/or plateau.
- **Delayed Onset of Muscle Soreness (DOMS):** Muscle soreness that occurs 1-2 days after an exercise training session.
- **Efficiency:** The ratio of energy expenditure to work output. How well an individual can perform or execute an exercise.
- **Fartlek (Speed Play):** A form of physical conditioning which alternates fast and slow running over varied terrain for 3-4 miles.
- **Force:** Any push or pull that tends to cause movement.
- **Interval Training:** A fitness workout that alternates harder and lighter bouts of intensities throughout the session.
- **Overload Principle:** To place greater than usual demands upon some part of the body.
- **Periodization:** A specific period of time (weeks, months, or years) over which the frequency, volume, and intensity of training are systematically varied to avoid over-training and to promote continued progress.
- **Plyometrics:** A method of resistance training that emphasizes the stretching of the muscle prior to the contraction.
- **Power:** The ability to exert muscular strength quickly.
 - Expressed as $\text{Force} \times \text{Speed} = \text{Power}$
- **Progressive Overload Principle:** Introducing overloads in a systematic manner.
- **Rest:** One must plan days of rest to yield an improvement in one's overall performance.
 - Active Rest– Days that consist of light, fun activities different from one's normal workout program.
 - Passive Rest– Days that consist of doing no activity.
- **Reversibility:** A loss of performance (detraining) in cardiorespiratory endurance, muscular strength and endurance and flexibility can occur when training ceases. One to two weeks of cessation of physical activity can result in a reduction in specific fitness gains.
- **Specificity Concept:** The idea that one should train in a specific manner to achieve a specific outcome.
- **Speed:** The ability to move the body quickly.
- **Training Effect:** Overall positive improvements in the performance of the heart, lungs, and muscles due to conditioning.
- **Training Variation:** Systematically manipulating training variables to create an overload thereby demanding the body to adapt and improve.

➤ **FITT Principles**

The four principles involved in all progressive exercise programs

- **Frequency:** How often one exercises during the week or the number of sessions one exercises during the week.
- **Intensity:** How hard one works during an exercise session.
- **Time (Duration):** The length of the exercise session.
- **Type:** The modality of the exercise chosen.

➤ **Exercise Guidelines (Based on ACSM Guidelines)**

• **Cardiovascular (Aerobic) Training**

- o Frequency: 3-5 Days a Week
- o Intensity
 - Guidelines for Monitoring Intensity
 - 60%-90% of MHR (Age Predicted Maximum Heart Rate)
 - 50%-85% of VO2max or HRR (Heart Rate Reserve)
 - Measuring Intensity
 - Taking a Pulse: Target Heart Rate Zone (THRZ)
 - o Either at neck (carotid artery) or wrist (radial artery)
 - o Take for 10 seconds and multiply by 6
 - o Age Predicted Maximum Heart Rate
 $220 - \text{Age} = \text{MHR}$
 $\text{MHR} \times .60 = \text{Low end of THRZ}$
 $\text{MHR} \times .90 = \text{Upper end of THRZ}$
 Target Heart Rate Zone is within 60-90%
 - o Karvonen Formula
 $220 - \text{Age} = \text{MHR}$
 $\text{MHR} - \text{Resting Heart Rate} = \text{HRR}$
 $\text{HRR} \times .50 + \text{Resting Heart Rate} = \text{Low end of THRZ}$
 $\text{HRR} \times .85 + \text{Resting Heart Rate} = \text{Upper end of THRZ}$
 Target Heart Rate Zone is within 50-85%
 - Perceived Exertion (See Appendix A)
 - o Borg's Original Rating of Perceived Exertion
 - o Borg's Revised Rating of Perceived Exertion
 - Talk Test
 - o Intensity is too high– If one cannot speak.
 - o Intensity is too low– If one can sing songs and make long speeches.
 - o Optimal Intensity– One should be breathing heavily and be able to speak in short phrases.
- o Time
 - Continuous vigorous activity for 20-60 minutes
 - When just beginning, do as much as can be tolerated
- o Type
 - Select activities the client will enjoy

- **Resistance Training**

- o Frequency: Minimum 2 days/week
- o Intensity: 8-10 Major Muscles
- o Time: 8-12 Reps/1-2 Sets
- o For continued muscular development increase to 3 sets and heavier load
- o Type: Choose free weights or resistance machines

- **Flexibility**

- o Frequency: At least 3 days/week or after every workout
- o Intensity: Stretch all major muscles to the point of mild discomfort
- o Time: Hold each stretch 15-30 seconds/repeat each stretch 3-5 sets
- o Type: Choose recommended stretches or recommend client participate in yoga or Pilates





Below are a series of questions designed to help you efficiently remember the course material. Before proceeding to the next page of the course content, please answer the following review questions.

Section #4 Review Questions

1. Define the following terms and briefly explain how each term applies to personal training:

Progressive Overload Principle:

Training Effect:

Cross Training:

Specificity Concept:

2. Explain how to determine age-predicted heart rate.

3. What are the guidelines recommended by ACSM in regards to frequency, intensity, time and mode of activity for:

Cardiovascular Fitness:

Resistance:

Flexibility:

➤ **Exercise Safety Guidelines**

- **General Safety Tips**
 - o Always consult a physician before beginning a new exercise program
 - o Warm up and cool down before and after every workout
 - o Avoid exercising in extreme temperatures (hot or cold) and humidity
 - o Take days off during the week to rest and repair the body
 - o Wear proper clothing and footwear
 - o Drink water before, during, and after exercise
 - o Maintain heart-rate within the target heart rate during exercise
 - o If one has a special health condition, take medication as prescribed by the doctor
 - o Warning signs to discontinue exercise and seek medical advice:
 - Labored breathing (difficulty breathing not associated with regular increased ventilation during exercise)
 - Loss of coordination
 - Dizziness
 - Tightness in chest
- **Older Adults**
 - o Choose a modality that does not impose significant orthopedic stress
 - o The activity should be convenient and fun—stress social aspects
 - o Emphasize programs that will enhance functional strength and flexibility thereby enhancing one's ability to lead an independent lifestyle
 - o Incorporate cardio activity
 - o Incorporate resistance training that focuses on muscular health and endurance emphasizing all major muscle groups
 - o Incorporate a flexibility program
- **Youth**
 - o Incorporate consistent but fun exercise program
 - o Children are more apt to adapt to a cardio exercise program that emulates the way children play. For example, intermittent bouts of cardio activity within a session models after children play tag.
 - o Incorporate a light resistance training program that incorporates tubing or light weights that will elicit a rep range of about 20. Limit resistance training to two days a week.
 - o Incorporate a flexibility program
 - o Teach proper eating habits
 - o Use multi-joint rather than single-joint exercises
 - o Children overheat much faster and are more prone to heat injuries than adults are

- **Pregnant Women**

- o Discuss first with the physician an exercise plan of action
- o Exercise at least three days a week
- o Perform a longer warm-up (10-15 minutes)
- o Pregnant women should listen to their bodies and adjust the intensity accordingly
- o Cease activity if fatigued and do not exercise to exhaustion
- o Use the talk test or RPE scale to monitor intensity
- o Aqua aerobics is recommended with pool temperature between 80-84°
- o Drink water before, during, and after exercise
- o Avoid exercising to exhaustion
- o Exercise in the supine position should be avoided after the first trimester
- o As part of the muscle conditioning, perform pelvic floor strengthening (Kegel) exercises
- o Avoid deep stretches
- o Consume 300 more calories per day and possibly more depending on level of activity

- **Asthma**

- o Exercise Induced Asthma– A condition that occurs when an individual breathes large volumes of dry air that cools and dries the respiratory tract. This causes the airway to constrict making it difficult to receive oxygen.
- o Avoid exercise in a cold, dry environment
- o One may choose an aquatic exercise program. The warm, humid air in an aquatic setting makes it easier for one to breathe.
- o Perform a longer warm-up
- o Interval training is optimal
- o Avoid eating at least two hours prior to exercise
- o Take prescribed medication prior to exercise
- o Have a bronchodilator on hand
- o Exercise with a buddy in case of an incident

- **Hypertension/Cardiac/Stroke Rehab Released Clients**

- o Only those who have been released by their doctors should participate in a group exercise class format
- o Exercise 3-5 days/week
- o Perform a longer warm-up
- o Emphasize large muscle dynamic movement done at moderate intensities (40-60% of MHR or RPE= 10-12) for long durations
- o Avoid interval training
- o Avoid raising the arms overhead for an extended period of time
- o If an individual complains of pain or pressure in the chest or feels dizzy, he/she should stop exercising and contact his/her doctor
- o Avoid Valsalva Maneuver: Increased pressure in the abdominal and thoracic cavities caused by breath holding and extreme effort
- o Encourage those who are prescribed medications to take them on a regular basis

- **Diabetes**

- o Type I Diabetes (Insulin Dependent) – A metabolic disorder characterized by inability to oxidize carbohydrates because of inadequate insulin.
 - Accounts for 10% of all diabetics.
 - If blood glucose is below 80-100 mg/dl, one should consume carbohydrates before exercising.
 - If blood glucose is above 250 mg/dl, one should delay exercise until the glucose is lowered.
 - One should not exercise during the peak insulin action. One should avoid injecting insulin into the working muscles and instead inject the insulin into a skinfold.
 - One should consume additional carbohydrates after exercise.
- o Type II Diabetes (Non-Insulin Dependent) – A metabolic disorder characterized by inability to oxidize carbohydrates because of a resistance to insulin.
 - Adult onset
 - Usually other health conditions are present such as obesity, high blood pressure, and high cholesterol
 - Can be controlled with diet and exercise. Individuals may take oral medication.
- o Exercise Guidelines (set by The American Diabetes Association)
 - Participants should drink water before, during, and after exercise.
 - Participants should plan the insulin injection in conjunction with the exercise session.
 - Participants should wear protective footwear.
 - Avoid extreme heat and cold environments.
 - Exercise at a steady pace, about 50-70% of VO₂ MAX or HRR. Avoid interval workouts.
 - Exercise with a buddy in case hypoglycemia or hyperglycemia occurs.
 - Have easily digestible carbohydrates on hand in case of a drop in glucose.
 - Personal trainers should ensure that they have instructions from their doctors on how to alter carbohydrates and insulin prior to exercise.

- **Arthritis**

- o Avoid exercise when the joint is inflamed.
- o Avoid exercise in the morning. This is when an individual has the least amount of mobility.
- o Perform a longer warm-up to increase the viscosity of the joint due to synovial fluid being released.
- o Move all joints through full range of motion including fingers and toes.
- o Perform exercises gently with little to no bounding.
- o Personal trainers should consider an aqua exercise program for these clients, keeping the water temperature between 86-90°.
- o Incorporate a well-rounded exercise program that incorporates cardio, resistance training, and flexibility.

- **Osteoporosis**
 - o A disease characterized by a decrease in the total amount of bone mineral and a decrease in the strength of the remaining bone.
 - o Personal trainers should consider for their clients a water exercise program that strengthens bones and the ligaments and tendons around the joints for stability.
- **Knee/Hip Problems**
 - o Incorporate resistance training to strengthen the ligaments and tendons that support the knee and hip
 - o Keep the movements fluid; avoid jerky, rushed movement
 - o Avoid twisting while keeping the feet planted on the floor
 - o Keep knees flexed
 - o Individuals with hip replacement should avoid crossing one leg over the other. Avoid hip flexion beyond 90°
- **Low Back Problems**
 - o Avoid bounding movements
 - o Avoid hyperextension of the lower back
 - o Strengthen abdominals
 - o Develop core strength
 - o Maintain neutral spine
 - o Stop if an exercise is painful
 - o Teach client proper lifting techniques
- **Athletes**
 - o Provide a variety of activities that offer a challenge
 - o Incorporate plyometric moves and interval training
 - o Incorporate games.
- **Obesity**
 - o Encourage a complete program of diet and exercise for weight loss
 - o Personal trainers should place importance on health as opposed to physical appearance
 - o Exercise 3-5 days/week
 - o Exercise for longer durations
 - o Avoid high impact moves
 - o Wear protective footwear
 - o Personal trainers may want to recommend water exercise for a combination of cardio and resistance training

➤ Injury Prevention

- Increase training gradually.
- Alternate more aggressive training days with less aggressive training days.
- Get plenty of sleep.
- Eat a healthy diet.
- Adjust training program when needed.
- Avoid overtraining—a condition in which there is a plateau or drop in performance over a period of time. This condition occurs when there is not sufficient time for the body to recoup after a workout session.
 - Warning signs—Extreme soreness and stiffness after training, irritableness, decrease in body weight, decrease in appetite, lack of motivation, and unable to complete a training session.
- **RICEM**—If one is injured, implement basic first aid until medical professionals take over.
 - Rest
 - Ice
 - Elevate
 - Compression
 - Modality—Change activity until healed





Below are a series of questions designed to help you efficiently remember the course material. Before proceeding to the next page of the course content, please answer the following review questions.

Section #5 Review Questions

1. What steps should the trainer take if he has a client who experiences labored breathing, tightness in the chest and lack of coordination?
2. _____ is a condition that occurs when an individual breathes large volumes of dry air that cools and dries the respiratory tract. This causes the airway to constrict making it difficult to receive _____.
3. When training clients who have suffered a stroke, the trainer should emphasize large muscle _____ movement performed at _____ intensities (_____ % of MHR) for _____ durations.
4. _____, which can often be controlled with lifestyle changes, is a metabolic disorder characterized by inability to oxidize carbohydrates because of a resistance to insulin.
5. Clients who suffer from _____ should perform a longer warm-up to increase the viscosity of the joint due to synovial fluid being released.

Basic Nutrition and Weight Management

Seven Nutrients

- **Carbohydrates (Energy Yielding Nutrient)**
 - o Function: Body's primary source of energy
 - o Stored as glycogen in liver and muscles
 - o Four calories per one gram of carbohydrate
 - o Categories of Carbohydrates:
 - Complex
 - Whole Grain Breads, Cereals, Pastas, Flour
 - Vegetables
 - Fruits
 - Simple
 - Syrups
 - Jellies
 - Cakes
 - o 55%-60% of daily caloric intake should come from carbohydrates
- **Fats (Energy Yielding Nutrient)**
 - o Function: Involved in the maintenance of healthy skin, insulation against heat and cold, protection of vital organs, major storage form of energy
 - o Stored in fat cells around organs and within the adipose tissue
 - o Nine calories per one gram of fat
 - o Categories
 - Unsaturated Fats (mono and poly): Associated with lower risk of developing heart disease
 - Olive Oil
 - Canola Oil
 - Corn Oil
 - Saturated Fats
 - Meats
 - Milk
 - Cream
 - Butter
 - Egg yolks
 - o 20%-30% of daily caloric intake should come from fats
 - o Less than 10% of Fat intake should come from saturated fats
- **Proteins (Energy Yielding Nutrient)**
 - o Function: The building blocks of the cells within the body. They repair, rebuild, and replace cells. They also regulate bodily processes involved in fighting infection.
 - o The simplest form of protein is amino acid and cannot be stored within the body.
 - o Four calories per one gram of protein.
 - o Categories of amino acids (20 total amino acids):
 - Nine Essential Amino Acids: Must be supplied through diet
 - Complete Protein: Foods that contain all nine essential amino acids (lean meats, fish, milk, and eggs)
 - Incomplete Protein: Foods that only supply some of the essential amino acids (cereals, nuts, dried peas, and beans)
 - Eleven Non-Essential Amino Acids: Produced by the body
 - o 10%-15% of daily caloric intake should come from protein

- **Fiber**
 - o Function: Fiber passes through the body and is not digestible. Fiber gives bulk to foods within the body to help with removal of waste products. Fiber keeps the digestive tract muscles healthy and carries harmful substances out of the body, thus aiding in the prevention of heart disease and cancer.
 - o Is not stored
 - o Zero calories
- **Vitamins**
 - o Function: Vitamins (13) are responsible for many bodily processes.
 - o Categories:
 - Fat Soluble Vitamins:
 - Stored in fat
 - A, D, E, K
 - Can be toxic if over-consumed
 - Water Soluble Vitamins:
 - Not stored within the body; either used or secreted
 - Bs and C
 - o Zero calories
- **Minerals**
 - o Function: Builders, activators, regulators, transmitters, and controllers of the body's metabolic processes. Work with vitamins for absorption into the body.
 - o Are not stored
 - o Zero calories
- **Water**
 - o Function: Provides the medium for and is an end product of activity. Water is important for efficient metabolism.
 - o Represents 40%-60% of an individual's total body weight
 - o Makes up about 72% of the weight of muscle
 - o Zero calories
 - o One should consume at least 64 ounces of water per day

Supplements/Ergogenic Aids

- It is recommended that you focus on receiving nutrients through proper eating habits as opposed to pills.
- "Mega Vitamins" may be too much for the body to actually absorb.
- If one is involved in a highly intense training program, he/she should consume a little more protein and carbohydrates.
- Women may want to take an iron and/or calcium supplement for added insurance.
- A multi-vitamin supplementation is sufficient for proper health if one is eating a balanced diet.
- Anabolic steroid usage is hazardous to one's health and has many adverse side effects.



10 Tips to a Great Plate!

Helping clients make food choices for a healthy lifestyle can be as simple as using these 10 Tips. Use the ideas in this list to encourage your clients to **balance calories**, to choose foods to **eat more often**, and to cut back on foods to **eat less often**.

#1 Balance Calories A first step in helping your client to manage weight is to determine a healthy calorie intake for your client. Go to www.ChooseMyPlate.gov to calculate calorie level.

#2 Enjoy Food But Eat Less Encourage your client to take time to fully enjoy food. Counsel clients on how to pay attention to hunger and fullness cues before, during, and after meals.

#3 Avoid Oversized Portions Suggest your client use a small dish/bowl and portion out foods before eating. When eating out, choose a smaller size option, share a dish, or take home part of the meal.

#4 Foods to Eat More Often Encourage your client to eat more vegetables, fruits, whole grains, and fat-free or 1% milk and dairy products. These foods have the nutrients needed for health—including potassium, calcium, vitamin D, and fiber. These foods should be the basis for meals and snacks.

#5 Half of Plate Should be Fruits and Vegetables Choose red, orange, and dark-green vegetables like tomatoes, sweet potatoes, and broccoli, along with other vegetables for your meals. Add fruit to meals as part of main or side dishes or as dessert.

#6 Switch to Fat-Free or Low-Fat (1%) Milk Fat-free or low-fat milk has the same amount of calcium and other essential nutrients as whole milk, but fewer calories and less saturated fat.

#7 Half of Grains Should be Whole Grains To eat more whole grains, substitute a whole-grain product for a refined product—such as eating whole-wheat bread instead of white bread or brown rice instead of white rice.

#8 Foods to Eat Less Often Cut back on foods high in solid fats, added sugars, and salt. They include cakes, cookies, ice cream, candies, sweetened drinks, pizza, and fatty meats like ribs, sausages, bacon, and hot dogs. Use these foods as occasional treats, not everyday foods.

#9 Compare Sodium in Foods Use the Nutrition Facts label to choose lower sodium versions of foods like soup, bread, and frozen meals. Select canned foods labeled “low sodium,” “reduced sodium,” or “no salt added.”

#10 Drink Water Instead of Sugary Drinks Cut calories by drinking water or unsweetened beverages. Soda, energy drinks, and sports drinks are a major source of added sugar, and calories, in American diets.

For more Information go to:
www.DietaryGuidelines.gov
www.ChooseMyPlate.gov
www.Health.gov/paguidelines
www.HealthFinder.gov

*Image supplied by U.S. Department of Agriculture. USDA does not endorse any products, services, or organizations.

Weight Management

- **Maintaining Weight**

- o Combining proper eating habits and regular exercise is the best method for managing weight
- o $\text{Caloric intake} = \text{Caloric expenditure}$

- **Losing Weight**

- o Goal: To increase lean mass while decreasing fat mass.
- o Caloric intake lower than caloric expenditure = weight loss.
 - Aerobic Activity: Expend 400-480 calories within 40 minutes.
 - Weight Resistance Training: Work all major muscles.
 - Aerobic vs. Resistance Training: Not as many calories are expended during resistance training as are expended during aerobic exercise, but resistance training will help to maintain or increase muscle mass which burns more calories at rest than by just having an aerobic program.
 - Nutrition: Reduce daily caloric intake by 250-500 calories but do not reduce total caloric intake by more than the recommended amounts:
 - Females: Begin to lose muscle tissue if caloric intake goes below 1,200 calories per day.
 - Males: Begin to lose muscle tissue if caloric intake goes below 1,500 calories per day.
- o Weight Loss Rate
 - Lose weight at a rate of 1-2 pounds per week
 - One pound of fat = 3,500 calories
 - Create a deficit of 3,500-7,000 calories per week through reducing caloric intake and increasing activity level

- **Gaining Weight**

- o Goal: To increase lean mass. Some individuals will hire a personal trainer to help them gain muscle tissue/mass.
- o Caloric intake higher than caloric expenditure = weight gain.
 - Aerobic Activity: Maximum 20 minutes.
 - Weight Resistance Training: Focus more on building up to a strength conditioning program using heavier weights working all major muscles.
 - Nutrition: Increase daily caloric intake by 250-500 calories.
 - An increase in proteins and carbohydrates will promote lean tissue growth.
 - Additional one pound of muscle requires 2,500 calories more than normal metabolism needs.



Below are a series of questions designed to help you efficiently remember the course material. Before proceeding to the next page of the course content, please answer the following review questions.

Section #6 Review Questions

1. List the seven nutrients and give a brief description of the role each nutrient plays in sound nutrition.

2. How many calories per gram are contained in:
 - Carbohydrates:
 - Fats:
 - Proteins:
 - Fiber:
 - Vitamins:
 - Minerals

3. List five of the ten tips to a "Great Plate."

4. How many calories are contained in a pound of fat?

Case Study: Mary Lou would like to lose weight before her 20-year high school reunion which is 20 weeks away. She can commit one hour a day five days a week to her fitness program. Design a program which includes cardio, strength training, and flexibility along with a sensible eating plan which will have Mary Lou reaching her 20-pound weight loss goal in time for the reunion.

Personal Trainer Checklist

Purpose: The Personal Trainer Checklist is a step-by-step list to take the personal trainer from a client's initial consultation through exercise prescription and program design. Check off the Personal Training Procedure when completed.

✓	Date Completed	Procedure
		Initial Consultation
		Provided Pre-Fitness Assessment Instructions (Appendix C)
		Sent Letter to Physician (if applicable) (Appendix F)
		Assessment of the Five Components of Fitness
		-Informed Consent Form (Appendix D)
		-PAR-Q Form (Appendix E)
		-Completed and Signed Letter to Physician if Applicable (Appendix F)
		-Resting Heart Rate
		-Resting Blood Pressure
		-Body Composition Test
		-Cardiorespiratory Fitness Test
		-Flexibility Test
		-Muscular Strength Test
		-Muscular Endurance Test
		Review Fitness Assessment Results and Goals with Client (Appendix G)
		Design Basic Six-Week Exercise and Weight Management Program (Appendix H)
		-Cardio Program
		-Weight Resistance Training Program
		-Flexibility
		-Specialized Weight Management Program
		Train Client for Six Weeks Making Needed Program Adjustments
		Re-test Client

Five Components of Fitness: Defined and Measured

Fitness Assessment

Goal: To receive base-line information about an individual in order to set goals and obtain a reference point

- **Measuring the Five Main Components of Fitness**
 - o Body Composition
 - o Cardiorespiratory Fitness
 - o Flexibility (lower back and hamstrings)
 - o Muscular Strength
 - o Muscular Endurance

- **Sequence of Testing and Exercise Prescription**
 - o Pre-Fitness Assessment Instructions (see Appendix C)
 - o Complete Informed Consent (see Appendix D)
 - o Complete PAR-Q Form (see Appendix E)
 - o Complete Letter To Physician (if applicable) (see Appendix F)
 - o Resting Heart Rate and Blood Pressure
 - o Body Composition
 - o Cardiorespiratory Fitness Test
 - o Flexibility Test
 - o Muscular Strength Test
 - o Muscular Endurance Test
 - o Review Results and Set Goals
 - o Prescribe Exercise
 - o Retest every three months

- **Testing Tools Needed**
 - o Pre-Fitness Assessment Instructions (see Appendix C)
 - o Informed Consent Form (see Appendix D)
 - o PAR-Q Form (see Appendix E)
 - o Letter to physician (if applicable) (see Appendix F)
 - o Stopwatch
 - o Blood pressure cuff or machine
 - o Skinfold calipers or bioelectrical impedance machine
 - o Twelve-inch step
 - o Metronome
 - o Sit and Reach Box or tape measure
 - o Bench Press or Leg Press machine
 - o Mat

➤ Resting Heart Rate and Blood Pressure

Before testing the Five Components of Fitness, the baseline vitals should be obtained.

Resting Heart Rate

Monitoring Time: Take Resting Heart Rate for one minute (60 seconds)

Pulse Palpation Sites: Carotid artery (neck) or radial (wrist)

- > 89 "Poor"
- > 79 "Fair"
- > 69 "Average"
- > 60 "Good"
- < 60 "Excellent"

Resting Blood Pressure

Monitoring: Use either a manual blood pressure cuff with stethoscope or blood pressure machine.

Resting Blood Pressure: American Heart Association Levels

Blood pressure is measured in millimeters of mercury (mm Hg). The classifications in the table below are for people who are not taking antihypertensive (blood pressure-lowering) drugs and are not acutely ill.

When a person's systolic⁺ and diastolic⁺⁺ pressures fall into different categories, the higher category is used to classify the blood pressure status. Diagnosing high blood pressure is based on the average of two or more readings taken at each of two or more visits after an initial screening.

Classification of blood pressure for adults age 18 years and older

Category	Systolic (mm Hg)		Diastolic (mm Hg)
Normal*	Less than 120	and	Less than 80
Prehypertension	120-139	or	80-89
Hypertension			
Stage 1	140-159	or	90-99
Stage 2	160 or higher	or	100 or higher

* Unusually low readings should be evaluated for clinical significance.

Experts usually recommend that people with diabetes keep their blood pressure under 130/80 mm Hg. The American Diabetes Association (ADA) recommends that people with diabetes get their blood pressure checked by a medical professional at least two to four times per year.

+Systolic Pressure: The blood pressure when the heart is contracting.

++Diastolic Pressure: The blood pressure when the heart is in a period of relaxation and dilatation (expansion).

➤ Body Composition

Body Composition: Body composition is based on relative percentages of various components of the body, usually divided into fat mass (% body fat) and fat free mass (% fat free mass). The Body Fat Percentage Chart provides information to assist in helping a client determine a healthy body fat.

Healthy body fat percentage is important to the body's ability to function properly. Body fat is important in regulating body temperature, insulating organs, and supplying energy to the body. Too much body fat can result in health risks associated with obesity. On the other hand, too little body fat can also result in potential life-threatening conditions.

Body Fat Percentage Chart*		
Description	Women	Men
Essential Fat	10-12%	2-4%
Athletes	14-20%	6-13%
Fitness	21-24%	14-17%
Acceptable	25-31%	18-25%
Obese	32+%	25+%

*Chart provided by American Council on Exercise

Methods of Body Composition Measurement

- Hydrostatic Underwater Weighing (Gold Standard)
- Infrared
- Bioelectrical Impedance
- Body Girth
- Waist to Hip Ratio (See Appendix B)
- BMI (See Appendix B)
- Skinfold Caliper: Procedures and Tools

Three-Site Skinfold Measurement

Measurements should be made on the right side of the body

Male: Chest, Abdomen, Thigh

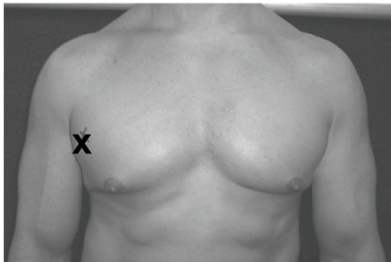
Women: Triceps, Iliac Crest, Thigh

- Caliper should be placed 1-2 cm away from the thumb and finger
 - Perpendicular to the skinfold
 - Halfway between the crest and the base of the fold
- Release the caliper lever so its spring tension is exerted on the skinfold
- Maintain pinch while reading caliper
- Read dial on caliper
 - 1 to 2 seconds after lever has been released
 - Per ACSM guidelines, reading is given to the nearest mm

- Take two measurements at each site
 - If second measurement is not the same reading, take a third measurement
 - If within 1 or 2 mm, take the average of the two measurements
 - If not within 1 or 2 mm, take a third measurement
 - Rotating through the measurement sites allows time for the skin to regain normal thickness
- Add the skinfold site readings. Refer to the Estimating Body Fat charts on the following pages.
- Then refer to the Body Fat Percentage chart above to counsel your client, setting a goal for healthy body fat percentage.

Three-Site Skinfold Measurement Locations

Men



Chest



Addominal

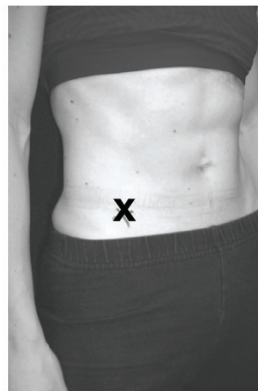


Thigh

Women



Tricep



Iliac Crest



Thigh

Estimating Men's Body Fat Percentage

	Men – Three-site (chest, abdominal, thigh)							
	Age							
	Site Total	20-29	30-39	40-49	50-59	60-69	70-79	
VL = Very Lean	99	4.2	7.0	9.2	10.9	11.5	13.6	VL
	95	6.3	9.9	12.8	14.4	15.5	15.2	
	90	7.9	11.9	14.9	16.7	17.6	17.8	
	85	9.2	13.3	16.3	18.0	18.8	19.2	
E = Excellent	80	10.5	14.5	17.4	19.1	19.7	20.4	E
G = Good	75	11.5	15.5	18.4	19.9	20.6	21.1	
F = Fair	70	12.7	16.5	19.1	20.7	21.3	21.6	
P = Poor	65	13.9	17.4	19.9	21.3	22.0	22.5	
VP = Very Poor	60	14.8	18.2	20.6	22.1	22.6	23.1	G
	55	15.8	19.0	21.3	22.7	23.2	23.7	
	50	16.6	19.7	21.9	23.2	23.7	24.1	
	45	17.4	20.4	22.6	23.9	24.4	24.4	
	40	18.6	21.3	23.4	24.6	25.2	24.8	F
	35	19.6	22.1	24.1	25.3	26.0	25.4	
	30	20.6	23.0	24.8	26.0	26.7	26.0	
	25	21.9	23.9	25.7	26.8	27.5	26.7	
	20	23.1	24.9	26.6	27.8	28.4	27.6	P
	15	24.6	26.2	27.7	28.9	29.4	28.9	
	10	26.3	27.8	29.2	30.3	30.9	30.4	
	5	28.9	30.2	31.2	32.5	32.9	32.4	
	1	33.3	34.3	35.0	36.4	36.8	35.5	VP
	n =	1826	8373	10442	6079	1836	301	
Total n = 28,857 based on Cooper Clinic								

Referenced from ACSM's Guidelines for Exercise Testing & Prescription, 8th ed. Wolters Kluwer, Lippincott Williams & Wilkins

Estimating Women's Body Fat Percentage

Women – Three-site (triceps, suprailiac, thigh)							
Age							
Site Total	20-29	30-39	40-49	50-59	60-69	70-79	
99	9.8	11.0	12.6	14.6	13.9	14.6	VL
95	13.6	14.0	15.6	17.2	17.7	16.6	
90	14.8	15.6	17.2	19.4	19.8	20.3	
85	15.8	16.6	18.6	20.9	21.4	23.0	
80	16.5	17.4	19.8	22.5	23.2	24.0	E
75	17.3	18.2	20.8	23.8	24.8	25.0	
70	18.0	19.1	21.9	25.1	25.9	26.2	
65	18.7	20.0	22.8	26.0	27.0	27.7	
60	19.4	20.8	23.8	27.0	27.9	28.6	G
55	20.1	21.7	24.8	27.9	28.7	29.7	
50	21.0	22.3	25.6	28.8	29.8	30.4	
45	21.9	23.5	26.5	29.7	30.6	31.3	
40	22.7	24.6	27.6	30.4	31.3	31.8	F
35	23.6	25.6	28.5	31.4	32.5	32.7	
30	24.5	26.7	29.6	32.5	33.3	33.9	
25	25.9	27.7	30.7	33.4	34.3	35.3	
20	27.1	29.1	31.9	34.5	35.4	36.0	P
15	28.9	30.9	33.5	35.6	36.2	37.4	
10	31.4	33.0	35.4	36.7	37.3	38.2	
5	35.2	35.8	37.4	38.3	39.0	39.3	
1	38.9	39.4	39.8	40.4	40.8	40.5	VP
n =	1360	3597	2808	2366	849	136	
Total n = 12,116 based on Cooper Clinic							

VL = Very Lean

E = Excellent

G = Good

F = Fair

P = Poor

VP = Very Poor

Referenced from ACSM's Guidelines for Exercise Testing & Prescription, 8th ed. Wolters Kluwer, Lippincott Williams & Wilkins



Below are a series of questions designed to help you efficiently remember the course material. Before proceeding to the next page of the course content, please answer the following review questions.

Section #7 Review Questions

1. Why is it recommended to conduct an initial fitness assessment with a new client and periodically re-assess following the initial fitness assessment?
2. _____ and _____ are the two sites used to take a pulse when taking a resting heart rate. The resting heart rate should be monitored for _____ seconds.
3. Define the following terms as they relate to blood pressure:
 - Systolic Pressure:

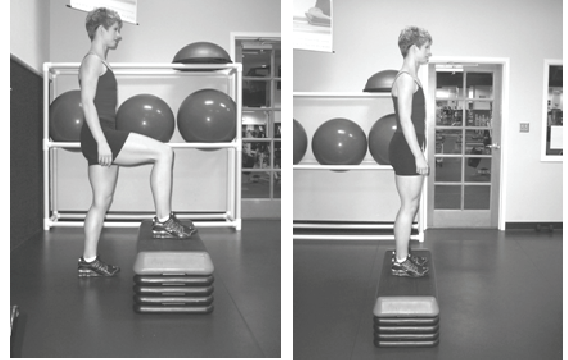
 - Diastolic Pressure:
4. The recommended healthy body fat ranges are _____ for men and _____ for women.
5. The three skinfold measurement sites for men are: _____, _____, and _____. The three skinfold measurement sites for women are: _____, _____, and _____.
6. Briefly explain how to calculate body fat for a 40-year-old female who has the following site readings.
 - Triceps: 15
 - Iliac Crest: 20
 - Thigh: 22

➤ Cardiorespiratory Fitness Testing

Cardiorespiratory Fitness - A measure of the heart's ability to pump oxygen-rich blood to the muscles

Three-Minute Step Test: Procedures and Tools

- Three-minute step test: Measuring the recovery heart rate
- Twelve-inch step
- Metronome 96 bpm
- Stopwatch
- Test: The client steps up and down for 3 minutes and the tester measures the heart rate for 1 minute after the 3-minute stepping. The tester should announce time at 1 minute, 2 minutes, and 2 minutes 40 seconds.
- Compare results to the chart



MEN - Age	18-25	26-35	36-45	46-55	56-65	65+
Excellent	<79	<81	<83	<87	<86	<88
Good	79-89	81-89	83-96	87-97	86-97	88-96
Above Average	90-99	90-99	97-103	98-105	98-103	97-103
Average	100-105	100-107	104-112	106-116	104-112	104-113
Below Average	106-116	108-117	113-119	117-122	113-120	114-120
Poor	117-128	118-128	120-130	123-132	121-129	121-130
Very Poor	>128	>128	>130	>132	>129	>130

WOMEN - Age	18-25	26-35	36-45	46-55	56-65	65+
Excellent	<85	<88	<90	<94	<95	<90
Good	85-98	88-99	90-102	94-104	95-104	90-102
Above Average	99-108	100-111	103-110	105-115	105-112	103-115
Average	109-117	112-119	111-118	116-120	113-118	116-122
Below Average	118-126	120-126	119-128	121-129	119-128	123-128
Poor	127-140	127-138	129-140	130-135	129-139	129-134
Very Poor	>140	>138	>140	>135	>139	>134

➤ Flexibility Testing

Flexibility - The ability to move a muscle or joint through its full range of motion without discomfort or pain

Procedures and Tools:

- Sit and Reach Test: Measuring the flexibility of lower back and hamstrings
- Sit and Reach Box or tape measure
- Sit and Reach Box Test: The client places bare-feet flat against box about 10-12 inches apart; places hands one over the other flat on top of the box; inhales and exhales as he slides his hands forward as far as he can; holds for one second, knees are straight.
- Tape Measure Test: Sit on the floor with the legs straight out with the feet 10-12 inches apart. Place the tape measure between the feet so that the 15-inch mark is at the heels. Place one hand over the other and reach as far as you can, keeping your legs straight.
- Record best out of three scores
- Compare results to the chart



Rating	Male	Female
Excellent	>22"	>24"
Good	16.5" - 21"	17.5" - 23"
Fair	12" - 16"	15" - 17"
Poor	<12"	<15"

➤ Muscular Strength Testing

Muscular Strength: The ability of a muscle to generate the maximum amount of force

Prediction of 1RM Protocol

The measure of muscular strength is one repetition maximum (1RM). Every major muscle group can be tested by attempting a maximal lift. However, it is possible to predict 1RM from a simple equation, using a sub maximal weight lifted for 1-10 repetitions. This is a safer method of testing.

The most common measures of upper and lower body strength are the bench press and leg press, respectively. Each of these exercises is a multiple joint movement. Norms are provided for each of these tests on the following page.

Procedures for 1RM Testing:

1. Perform light warm-up of 5-10 repetitions at 40-60% of perceived maximum exertion (light to moderate).
2. Take a one-minute rest with light stretching.
3. Choose a load that can be lifted between 1 and 10 repetitions at 60-80% of perceived maximum exertion (moderate to hard). Lift that load as many times as possible up to 10 repetitions. If more than 10 repetitions can be performed, the chosen load is too light and additional weight will need to be added until only 1-10 repetitions can be completed.
4. Then use the load lifted in step 3 to compute 1RM with the following equation:
 - $\text{Weight Lifted} \times \text{Number of Repetitions} \times 0.03 = 1\text{RM Equivalent}$
5. Compare to standards for 1RM protocol by using the following equation:
 - $1\text{RM Equivalent} \div \text{Body Weight} = \text{Results (compare to charts)}$

The dynamometer (isometric strength) test can be used to also assess strength (grip strength). However, it requires the use of a dynamometer, a piece of equipment that is generally not readily available in the fitness club setting. The test is conducted by the client holding the dynamometer down by the side with the dial facing out. Client then inhales and squeezes the hand as hard as possible as he exhales.

Muscular Strength Testing Norms

Leg Press	MEN						
	Age	<20	20-29	30-39	40-49	50-59	60-69
	Superior	>2.28	>2.13	>1.93	>1.82	>1.71	>1.62
	Excellent	2.05-2.27	1.98-2.12	1.78-1.92	1.69-1.81	1.59-1.70	1.50-1.61
	Good	1.91-2.04	1.84-1.97	1.66-1.77	1.58-1.68	1.47-1.58	1.39-1.49
	Fair	1.71-1.90	1.64-1.83	1.53-1.65	1.45-1.57	1.33-1.46	1.26-1.38
	Poor	<1.70	<1.63	<1.52	>1.44	<1.32	<1.25
	WOMEN						
	Age	<20	20-29	30-39	40-49	50-59	60-69
	Superior	>1.71	>1.68	>1.47	>1.37	>1.25	>1.18
	Excellent	1.60-1.70	1.51-1.67	1.34-1.46	1.24-1.36	1.11-1.24	1.05-1.17
	Good	1.39-1.59	1.38-1.50	1.22-1.33	1.14-1.23	1.00-1.10	0.94-1.04
	Fair	1.23-1.38	1.23-1.37	1.10-1.21	1.03-1.13	0.89-0.99	0.86-0.93
	Poor	<1.22	<1.22	<1.09	<1.02	<0.88	<0.85

Bench Press	MEN						
	Age	<20	20-29	30-39	40-49	50-59	60-69
	Superior	>1.34	>1.32	>1.12	>1.00	>0.90	>0.82
	Excellent	1.20-1.33	1.15-1.31	0.99-1.11	0.89-0.99	0.80-0.89	0.72-0.81
	Good	1.07-1.19	1.00-1.14	0.89-0.98	0.81-0.88	0.72-0.79	0.67-0.71
	Fair	0.90-1.06	0.89-0.99	0.79-0.88	0.73-0.80	0.64-0.71	0.58-0.66
	Poor	<0.89	<0.88	<0.78	<0.72	<0.63	<0.57
	WOMEN						
	Age	<20	20-29	30-39	40-49	50-59	60-69
	Superior	>0.78	>0.81	>0.71	>0.63	>0.56	>0.55
	Excellent	0.66-0.77	0.71-0.80	0.61-0.70	0.55-0.62	0.49-0.55	0.48-0.54
	Good	0.59-0.65	0.60-0.70	0.54-0.60	0.51-0.54	0.44-0.48	0.43-0.47
	Fair	0.54-0.58	0.52-0.59	0.46-0.53	0.44-0.50	0.40-0.43	0.39-0.42
	Poor	<0.53	<0.51	<0.47	<0.43	<0.39	<0.38

➤ Muscular Endurance Testing

Muscular Endurance - The ability of the muscle group to perform repetitive contractions over an adequate period of time to cause muscular fatigue

Two field tests that can be used to test muscular endurance that do not require equipment are the Half Sit-up Test and the Push-up Test. These tests will evaluate the endurance of the abdominal and upper-body muscles. The results of both evaluations will provide valuable screening information relating to various health indicators. For example, weak abdominal muscles can be a contributor to low-back pain. Testing for muscular endurance will provide a baseline which can be used as tangible evidence of improvement in fitness level which will be seen in subsequent testing.

Seriously de-conditioned and/or obese individuals can find these evaluations very difficult to perform. Poor performance may actually inhibit and discourage an individual from participating in a fitness program. Therefore, it is strongly advised that the personal trainer use discretion and good judgment when deciding whether these tests are appropriate.

Push-up Test

- **Test:** The client performs as many push-ups as he can to failure. He must go to the point where the elbow is at a 90-degree angle. Both men and women can perform standard push-ups or push-ups with knees on the floor (modified push-ups). The norms in the chart for women are for modified push-ups. When women perform the standard push-up and men perform the modified push-up, compare the initial testing scores to subsequent testing scores to evaluate improvement rather than referring to the gender specific charts.

Half Sit-up Test

- **Test:** The client performs as many half sit-ups (bent-knee curl-ups) as he can in one (1) minute. Full sit-up tests are not recommended because the involvement of the hip flexors during the upward motion can potentially cause stress to the low back. The half sit-ups performed during the test reduce the potential for low-back injury and better assesses the function and endurance of the abdominal muscles.
- Lie on the floor with knees bent, feet flat. Hands should rest on the thighs. Contract the abdominals, press the back flat, and raise high enough for hands to touch the tops of the knees. Avoid pulling on neck or head and keep lower back on the floor. An alternate to having hands touch tops of knees would be to have arms resting at the sides and placing piece of masking tape at fingertips. A second piece of masking tape is placed 8 cm (for those ≥ 45) or 12 cm (for those <45) beyond the first. Client will reach fingers to second piece of tape as they perform half sit-up.
- Compare results to the chart on the following page.

Muscular Endurance Test Charts

Push-ups	MEN			
	Age	<30	30-50	>50
	Excellent	>71	>64	>56
	Good	63-71	57-64	50-56
	Average	54-62	48-56	43-49
	Fair	44-53	39-47	34-42
	Poor	<44	<39	<34
	WOMEN			
	Age	<30	30-50	>50
	Excellent	>35	>31	>28
	Good	30-35	27-31	24-28
	Average	24-29	21-26	20-23
	Fair	16-23	13-20	12-19
	Poor	<16	<13	<12

Half Sit-ups	Rating	Male	Female
	Excellent	>50	>45
	Good	21-49	18-44
	Fair	<21	<18



Below are a series of questions designed to help you efficiently remember the course material. Before proceeding to the next page of the course content, please answer the following review questions.

Section #8 Review Questions

1. What is the purpose of conducting a Three-Minute Step Test?
 - What equipment is needed to conduct the Three-Minute Step Test?
 - Explain the procedures of conducting the Three-Minute Step Test.
2. What is the definition of flexibility?
 - Explain how to conduct the Sit and Reach Test using a measuring tape.
3. Define 1RM and briefly explain how to determine a client's 1RM.
4. How is muscular endurance defined?
 - _____ is a field test that can be conducted to test upper body endurance. Briefly explain how to conduct the test.
 - _____ is a field test that can be conducted to test abdominal and low back function and endurance. Briefly explain how to conduct the test.

Exercise Prescription and Program Design

➤ Cardio Program—Aerobic/Anaerobic Activities/ Energy Expenditure

Cardio Program: Prescribe a cardio program according to the ACSM guidelines (Page 21).
Prescribe a cardio activity(ies) that the client enjoys and to which the client will adhere.

Example Aerobic/Anaerobic Activities and Energy Expenditure

Fitness Activity	Aerobic/ Anaerobic	Muscles Trained	Cals/Min Avg Male 180 lbs	Cals/Min Avg Female 130 lbs
Low Impact Aerobic Class	Aerobic	Heart & Total Body Conditioning	8	6
High Impact Step Aerobics	Aerobic	Heart & Total Body Conditioning	14	10
Stair Stepper Machine	Aerobic	Heart, Glutes, Hamstrings, Quads, Calves	9	6
Elliptical Machine	Aerobic	Heart, Glutes, Hamstrings, Quads, Calves	13	9
Rowing Machine	Aerobic	Heart & Total Body Conditioning	12	9
Cycling 16-19 mph	Aerobic	Heart, Glutes, Hamstrings, Quads, Calves, Core	17	12
Racquetball	Anaerobic	Heart & Total Body Conditioning	12	8
Walking 4 mph (15 min/mile)	Aerobic	Heart & Total Body Conditioning	6	5
Running 6 mph (10 min/mile)	Aerobic	Heart & Total Body Conditioning	14	10
Circuit Training	Aerobic/Anaerobic	Heart & Total Body Conditioning	12	8
Rollerblading	Aerobic	Heart, Glutes, Hamstrings, Quads, Core	10	7
Swimming Laps Vigorously	Aerobic	Heart, Arms, Lats, Glutes, Hamstrings, Abs	16	10
Water Skiing	Anaerobic	Total Upper Body & Lower Body Toning, Core	9	6
Water Volleyball	Anaerobic	Total Upper Body & Lower Body Toning, Core	4	3
Beach/Sand Volleyball	Anaerobic	Total Upper Body & Lower Body Toning	12	8
Court/Volleyball	Anaerobic	Total Upper Body & Lower Body Toning	5	4
Tennis	Anaerobic	Heart, Upper Body & Lower Body Toning	10	7
Basketball	Aerobic/Anaerobic	Heart, Upper Body & Lower Body Toning	12	8
Golf/Walking w/Clubs	Aerobic/Anaerobic	Heart, Upper Body & Core	8	6
Hiking	Aerobic	Heart & Lower Body	9	6
Snorkeling	Aerobic	Heart & Core	7	5
Scuba Diving	Aerobic	Heart & Core	10	7

➤ Resistance Training Program

Lifting Safety Guidelines and Techniques

- Lift on a regular basis.
- Build in days of rest before working the same muscle 24-48 hours but no more than 72 hours.
- Always check the integrity of the equipment.
- Always store the free weights after use.
- Avoid resting on a machine between sets. Allow other people to work through that machine while resting.
- Always warm-up and cool-down.
- Gradually increase load, reps, and sets.
- Breathing: Inhale to prepare, exhale to execute/lift, inhale to lower.
- When using machines, avoid banging the weight plates together between each rep.
- Avoid hyper-extending knees and elbows.
- When loading and unloading weights, use proper lifting techniques by using legs and avoiding any twisting of the torso.
- Use 2/4 Ratio Lifting Technique: Lift with control on a count of 2, release on a count of 4.
- Avoid using other body parts to compensate for weak muscles. If one is using the entire body to lift load during an isolated exercise, then the load needs to be decreased.
- Body Positioning
 - o Weight Machines: Position the body within the machine so that the moving joint of the body lines up with the cam or “joint” of the machine
 - o Standing Position
 - Create a base of support for greater stability by placing the feet about shoulder-width apart or more
 - Avoid bending from the waist straining the back, use the legs
 - Keep the knees slightly flexed
 - Keep eyes forward and the head, neck, and spine in alignment
 - Keep a neutral spine
 - o Supine Position on Bench
 - Keep the lower back in contact with the bench
 - Four Points of Contact: Head, shoulders, buttocks in contact with the bench and the feet flat on the floor
- Gripping the Barbell: Always use a closed-hand grip
 - o Overhand: Example of Use: Bent-over row
 - o Underhand: Example of Use: Bicep curl
 - o Alternated: Example of Use: spotter's handoff position to lifter
- Width of Grip
 - o Wide: The hands are placed on the bar as close to the weight plates as possible
 - Example of Use: Barbell bench press
 - o Common: The hands are placed on the bar about shoulder width and equidistant from the weight plates
 - Example of Use: Barbell bicep curl
 - o Narrow: The hands are placed closer together, more narrow than the common grip
 - Example of Use: Barbell triceps extension

➤ **Weight Training Program**

- **Lifting Terms**
 - o Load: The amount of weight lifted
 - o Rep (Repetition): The execution of an exercise one time or the lift and lower of a load one time
 - o Sets: A group of consecutive repetitions performed in an exercise without rest

- **Spotter's Responsibilities:** Spotters play a crucial role in making weight training a safe activity. He/she assists and protects the lifter from injury.
 - o Remove loose items from lifting area
 - o Place body in good lifting position (knees bent/back flat)
 - o Effectively communicate with lifter
 - o Use appropriate grip (closed alternated hand-off grip)
 - o See that the bar is properly loaded
 - o Be alert and quick to respond to dangerous situations
 - o Know when and how much assistance is needed
 - o As a last resort, assume all of the weight of the bar
 - o Correct the form of the client if needed

- **Responsibilities of the Lifter to the Spotter:** The client is also responsible for his/her actions to protect the safety of the spotter and himself/herself.
 - o Confirm the number of reps with the spotter/personal trainer before performing the exercise
 - o Indicate when assistance is needed
 - o Always stay with the bar even when in need of a spot
 - o With the assistance of the personal trainer, learn limits and select appropriate loads and reps

Six-Week Basic Weight Training Program/Three Days a Week

This weight training program is designed to be a basic six-week program for beginner individuals to build a base before moving to specialized and more intricate weight training programs to reach specific goals. This program consists of 18 workouts that occur 3 days a week over a span of 6 weeks. Re-test at the conclusion of the 6 weeks after a total of 18 workouts to provide client with valuable feedback and results.

Variable	Workout #1	Workouts #2 - #4	Workouts #5 - #18
Reps	12-15	12-15	12-15
Sets	1 Set	2 Sets	3 Sets
Rest-Period	1 Minute	1 Minute	30 Secs – 1 Minute
Load	The weight should be heavy/light enough to elicit a rep range of 12-15.		

Training 11 Major Muscle Groups: For each muscle group choose one exercise

1. Pectorals
2. Rhomboids
3. Latissimus Dorsi
4. Deltoids
5. Biceps
6. Triceps
7. Quadriceps
8. Hamstrings
9. Quadriceps, Hamstrings, and Glutes (Multi-Joint Exercises)
10. Erector Spinae
11. Abdominals



Below are a series of questions designed to help you efficiently remember the course material. Before proceeding to the next page of the course content, please answer the following review questions.

Section #9 Review Questions

1. Explain the 2/4 Ratio Lifting Technique.
2. What is the correct positioning on a weight machine with a cam or "joint"?
3. What 11 major muscle groups should be targeted in a general conditioning program?
4. What is meant by the "Four Points of Contact"?
5. Define the following lifting terms:
 - Load:
 - Repetitions:
 - Sets

FiTOUR®

Primary Personal Trainer

Resistance Training Exercises



The following pages contain resistance training exercises for the major muscle groups to be used in a six-week general conditioning program.

Pectorals

Barbell Bench Press

Prime Muscle Movers: Pectoralis major, anterior deltoid, triceps

Technique: Lie flat on the bench. Grasp bar with hands wider than shoulder distance apart directly above the chest, arms fully extended. Maintain the four points of contact with head, shoulders, buttocks in contact with bench and feet flat on the floor. Inhale while slowly lowering barbell towards chest by bending elbows to a 90 degree angle followed with an exhale while pressing barbell to starting position. Do not bounce barbell on the chest.



Machine Chest Press

Prime Muscle Movers: Pectoralis major, triceps

Technique: Sit on the machine with chest aligned with the handles of the machine. Grasp the handles with the hands shoulder-distance apart. Exhale while slowly pressing the handles forward. Inhale while slowly returning to starting position. Avoid locking the elbows when arms are extended.



Machine Fly

Prime Muscle Movers: Pectoralis major, anterior deltoids, triceps

Technique: Sit on machine with shoulders in line with the rotating cams and handles chest level. Grasp the handles. Exhale while slowly bringing the hands towards each other. Inhale while slowly return to starting position.

Dumbbell Fly

Prime Muscle Movers: Pectoralis major, anterior deltoids, triceps

Technique: Holding a dumbbell in each hand, lie on a flat bench with arms extended over the chest. Inhale while slowly lowering arms to horizontal by bending the elbows. Exhale while slowly extending the arms to return to starting position.



Rhomboids/Latissimus Dorsi



Bent Over Barbell Row

Prime Muscle Movers: Latissimus dorsi, teres major, posterior deltoids, rhomboids

Technique: Holding a barbell with an overhand grip, hands shoulder-width apart, standing with feet approximately hip distance and knees slightly bent. Slowly lower the barbell to knee level. Inhale to begin. Exhale while pulling the barbell toward the torso. Inhale while returning to starting position. To avoid stress to the low back, perform an isometric contraction of the muscles of the torso during performance of the exercise.

Cable Machine Seated Row

Prime Muscle Movers: Latissimus dorsi, teres major, rhomboids, posterior deltoids

Technique: Sit on the machine with feet resting on footpad. Reach forward from the hips to grasp the handles. Inhale and slowly exhale while pulling elbows back as far as possible. Inhale while slowly returning to starting position. To avoid stress to the low back, keep the abdominal muscles contracted and upper back extended throughout the movement.



Machine Seated Row

Prime Muscle Movers: Latissimus dorsi, teres major, rhomboids, posterior deltoids

Technique: Sit on machine with handles at chest level. Grasp the handles. Inhale. Exhale while slowly pulling the elbows back toward the ribcage. Inhale while returning to starting position.



Latissimus Dorsi

Dumbbell One Arm Row

Prime Muscle Movers: Latissimus dorsi, teres major, posterior deltoid, rhomboids

Technique: Grasp a dumbbell in one hand. Kneel opposite knee on bench with opposite hand placed in front of knee on bench. Inhale. Exhale while pulling elbow toward side of ribcage. Inhale while returning hand to starting position. Be certain to keep torso lifted and avoid rounding through upper back while performing exercise.



Machine Lat Pulldown

Prime Muscle Movers: Latissimus dorsi, rhomboids, trapezius

Technique: Grasp the bar with both hands shoulder-width apart. Sit on seat with arms full extended and knees under the stabilizing pads. Lean slightly back from the waist with a long spine to avoid hitting nose or chin with the bar. Pull the bar down toward the sternum and slowly return to starting position.





Below are a series of questions designed to help you efficiently remember the course material. Before proceeding to the next page of the course content, please answer the following review questions.

Section #10 Review Questions

1. List the prime movers and the plane of movement for each of the following exercises:
 - Bent Over Barbell Row:
 - Machine Fly:
 - Dumbbell Fly:
 - Machine Lat Pulldown:
2. Briefly describe how to properly perform the following exercises and indicate the plane of movement for each exercise:
 - Dumbbell One Arm Row:
 - Barbell Bench Press:
 - Cable Machine Seated Row:

Deltoids

Barbell Shoulder Press

Prime Muscle Movers: Anterior and medial deltoids

Technique: Perform standing or sitting. Grasp bar slightly wider than shoulder-width with an overhand grip. Inhale to prepare. Exhale while pressing bar overhead. Slowly return to starting position.



Machine Shoulder Press

Prime Muscle Movers: Anterior and medial deltoids

Technique: Sit on machine. Grasp handles with palms facing away from body. Inhale to prepare. Exhale while pressing bar overhead. Slowly return to starting position.



Deltoids (cont.)

Dumbbell Lateral (Side) Raise

Prime Muscle Movers: Medial deltoid

Technique: Perform standing or sitting. Hold dumbbells in each hand with overhand grip. Begin with dumbbells to the side of hips. Inhale to prepare. Keeping elbows slight bent, exhale while raising the arms to horizontal. Return to starting position.



Dumbbell Anterior (Front) Raise

Prime Muscle Movers: Anterior deltoid

Technique: Perform standing or sitting. Hold dumbbells in each hand with overhand grip. Begin with hands in front of or next to thighs. Inhale to prepare. Exhale while lifting right hand with arm extended to shoulder level. Alternate right and left arm raises.

Machine Posterior (Rear) Deltoid

Prime Muscle Movers: Posterior deltoid

Technique: Sit facing machine with machine seat positioned with handles at shoulder height. Grasp handles with palms facing machine. Inhale to prepare. Exhale while pulling elbows back, squeezing shoulder blades towards each other at end of movement. Slowly return to starting position.



Biceps

Barbell Bicep Curl

Prime Muscle Movers: Biceps brachii, brachialis

Technique: Grasp barbell with underhand grip with hands slightly wider than shoulder-width. Inhale to prepare. Exhale by flexing elbows and bringing hands toward shoulders. Slowly return to starting position.



Machine Bicep Curl

Prime Muscle Movers: Biceps brachii, brachialis

Technique: Position the seat of the machine with upper arms resting on the pad with elbows in line with the axis of the machine. Grasp the handles with an underhand grip. Keeping the upper arms in place, inhale to prepare and exhale while flexing the elbows and bringing hands toward shoulders. Slowly return to starting position.

Dumbbell Concentration Curl

Prime Muscle Movers: Biceps brachii, brachialis

Technique: Sit on a bench with a dumbbell in right hand. Position elbow on inside of right thigh. Begin with arm extended, elbow soft. Inhale to prepare. Exhale while flexing the elbow and bringing the right hand toward the right shoulder. Slowly return to starting position. Perform selected number of reps. Repeat with left arm.



Triceps

Standing Barbell Triceps Extensions

Prime Muscle Movers: Triceps brachii

Technique: Grasp barbell with overhand grip. Bring barbell to shoulder level and extend arms overhead. Keeping elbows above shoulders, inhale to prepare. Exhale while slowly flexing elbows and bringing barbell towards crown of head or slightly behind head. Slowly return to starting position.



Lying Dumbbell Triceps Extensions

Prime Muscle Movers: Triceps brachii

Technique: Grasp a dumbbell in each hand. Lie on a flat bench with arms extended at shoulder level. Keep elbows above the shoulders throughout the movement. Inhale and lower weights toward shoulders on either side of the head. Exhale while extending elbows and bringing hands to starting position.



Triceps (cont.)



Machine Triceps Extension

Prime Muscle Movers: Triceps brachii

Technique: Position machine seat so that upper arms rest on pad with elbows in line with the axis of rotation. Grasp handles with both hands. Inhale to prepare. Exhale extend arms. Slowly return to starting position.

Cable Machine Triceps Pressdown

Prime Muscle Movers: Triceps brachii

Technique: Stand facing cable machine. Grasp handle with overhand grip with elbows close to body. Inhale to prepare. Exhale extend arms. Slowly return to starting position.





Below are a series of questions designed to help you efficiently remember the course material. Before proceeding to the next page of the course content, please answer the following review questions.

Section #11 Review Questions

1. List the prime muscle movers and plane of movement for the following exercises:
 - Machine Triceps Extension:
 - Barbell Biceps Curl:
 - Barbell Shoulder Press:
2. Explain how to properly perform the following exercises and list the plane of movement for each exercise:
 - Dumbbell Lateral Raises:
 - Dumbbell Anterior (Front) Raises:
 - Machine Shoulder Press:
 - Barbell Shoulder Press:
 - Standing Barbell Triceps Extension:

Thighs

Machine Leg Extension

Prime Muscle Movers: Quadriceps

Technique: Position machine back with knees in line with the axis of rotation. Position foot pad to rest on bottom of shin. Grasp the handles or seat to keep torso immobile during movement. Inhale to prepare. Exhale while extending knees to bring legs to horizontal. Slowly return to starting position.



Machine Leg Curl

Prime Muscle Movers: Hamstrings

Technique: Lie face down on machine with knees in line with the axis of rotation. Position the foot pad to rest on bottom of lower leg at the ankle. Grasp the handles. Begin with knees extended. Inhale to prepare. Exhale while flexing the knees and bringing heels towards the gluteus muscles. Slowly return to starting position.

Thighs (cont.)

Machine Inner Thigh

Prime Muscle Movers: Adductors

Technique: Sit on machine with inside of knees resting on machine pads and feet positioned in foot rests. Grasp machine handles to keep torso stable. Inhale to prepare. Exhale while slowly bringing knees together. Slowly return to starting position.



Machine Outer Thigh

Prime Muscle Movers: Abductors

Technique: Sit on machine with outside of knees resting on machine pads and feet positioned in foot rests. Grasp machine handles to keep torso stable. Inhale to prepare. Exhale while slowly opening legs. Slowly return to starting position.

Quadriceps, Hamstrings and Glutes (Multi-Joint Exercises)

Dumbbell Lunges

Prime Muscle Movers: Gluteus maximus, quadriceps

Technique: Holding a dumbbell in each hand, stand with hip-distance apart. Inhale and take a big step forward to bring the front knee to a 90 degree angle. Exhale while stepping back with front leg to starting position. Can be performed with one complete set on one side or alternate legs.



Machine Leg Press

Prime Muscle Movers: Quadriceps, gluteus maximus

Technique: Sit on machine with knees at a 90° angle and feet shoulder-width apart on the foot pad. Fully extend legs (without locking knees) and slowly return to starting position. Keep back of the torso pressing into the seat back of the machine while performing the exercise.





Below are a series of questions designed to help you efficiently remember the course material. Before proceeding to the next page of the course content, please answer the following review questions.

Section #12 Review Questions

1. List the prime muscle movers and plane of movement for the following exercises:
 - Machine Leg Extension:

 - Machine Leg Curl:

 - Machine Inner Thigh:

2. Briefly explain how to perform each exercise and list the plane of movement for each:
 - Machine Outer Thigh:

 - Dumbbell Lunges:

 - Machine Leg Press:

Weight Training Program: Erector Spinae (Lower Back)

Roman Chair Back Extension

Prime Muscle Movers: Lumbar erector spinae (low back) and multifidus

Technique: Lie face down on Roman Chair with ankles positioned under foot pads. Position body so that hips flex over the support pad. Pubic bone should not rest on support pad. Begin exercise with torso in flexed position. Inhale to prepare. Exhale while slowly extending back to horizontal. Slowly return to starting position.

Safety Tip: *Individuals with low-back issues may need to perform this exercise at half-range of motion. This can be done by not fully extending the back at the end of the movement.*



Machine Back Extension

Prime Muscle Movers: Erector spinae

Technique: Sit on machine with hips in line with the axis of rotation. Adjust machine to appropriate position depending on low-back flexibility. Inhale to prepare. Exhale while slowly extending back and pressing upper back against pads during extension. Slowly return to starting position.

Stability Ball Back Extension

Prime Muscle Movers: Erector spinae

Technique: Begin in a kneeling position behind a stability ball. With hands on ball, lean hips, abdominals and chest into ball. Place hands behind the head. Inhale to prepare. Exhale as you lift chest off the ball. Squeeze shoulder blades towards each other and contract gluteal muscles at top of extension. Slowly return to starting position.



Weight Training Program: Abdominals

Crunches

Prime Muscle Movers: Rectus abdominis

Technique: Lie on back with hands behind the head with knees bent and feet resting on a bench. Inhale to prepare. Exhale while bringing head, shoulders, and chest off floor by rounding upper spine into a "crunch."



Stability Ball Crunch

Prime Muscle Movers: Rectus abdominis

Technique: Lie on ball in a supine position with lower back and upper back resting on the ball. Feet are placed on the floor at hip-distance. Place hands behind the head. Inhale to prepare. Exhale while crunching torso up and lifting the shoulders and upper back off the ball. Low back remains in contact with the ball throughout the exercise. Inhale while slowly returning to starting position.

Weight Training Program: Abdominals

Oblique Twist

Prime Muscle Movers: Rectus abdominis, obliques

Technique: While performing crunches, alternate bringing right elbow toward left knee and left elbow toward right knee.



Machine Crunches

Prime Muscle Movers: Rectus abdominis

Technique: Sit on machine with hips in line with axis of rotation and feet positioned under foot pads. Place the chest on the torso pad and grasp handles with both hands. Inhale to prepare. Exhale while flexing forward from the hips and moving the torso pad forward by pressing the chest into the pad and pulling with the arms. Slowly return to starting position.



Below are a series of questions designed to help you efficiently remember the course material. Before proceeding to the next page of the course content, please answer the following review questions.

Section #13 Review Questions

1. List the prime muscle mover and plane of movement for the following exercises:

- Roman Chair Back Extension:
- Crunches

2. List the plane of movement for each of the following exercises:

- Oblique Twist:
- Machine Back Extension:
- Stability Ball Back Extension:

FiTOUR®

Primary Personal Trainer Flexibility Exercises



The following pages contain stretches for all of the major muscle groups.

Flexibility Program

- **Flexibility**

- o Frequency: At least three days/week or after every workout.
- o Intensity: Stretch all major muscles to the point of mild discomfort.
- o Time: Hold each stretch 15-30 seconds/repeat each stretch 3-5 sets.

Upper Body Stretches



Pectorals

Technique: Extend arms behind back and grasp hands together by entwining fingers. Press the hands downward and hold for 15-30 seconds. Be mindful of keeping hands close to the body to avoid hyperextension of the shoulders.



Rhomboids/Upper Back

Technique: Grasp both hands together with fingers entwined and extend arms in front of the body. Gently round the upper back until a stretch is felt through the upper back. Hold 15-30 seconds.



Deltoids

Technique: Grasp forearm with opposite hand and gently pull arm across body toward opposite shoulder. Hold 15-30 seconds. Repeat on opposite side.



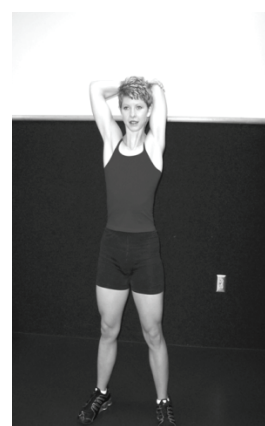
Latissimus Dorsi

Technique: With one hand, grasp a stationary object such as the frame of a squat machine or door frame. Hinging forward from the hips and slightly rounding the upper back, pull away until a stretch is felt through the side of the back. Hold 15-30 seconds. Repeat on the other side.



Biceps

Technique: Extend both arms behind back with wrists extended and fingers spread. Hold 15-30 seconds.



Triceps

Technique: Bring one arm close to side of head and bend elbow until hand is touching upper back. Place opposite hand on top of elbow and gently press to assist with increasing the stretch in the triceps. Hold 15-30 seconds. Repeat on opposite side.

Lower Body Stretches

Hamstrings

Technique: Standing on left leg, extend the right leg with foot flexed. Place hands on tops of thighs to avoid stress to the knee joints. Slowly hinge forward from the hips until a gentle stretch is felt in the right hamstring. Hold 15-30 seconds. Repeat on other side.



Quadriceps

Technique: Grasp right toe, heel, or ankle with left hand. Keeping inside of knees close together, press forward through the front of the right hip while pulling the right foot toward the right buttocks until a gentle stretch is felt. Hold 15-30 seconds. Repeat on opposite side.



Hip Flexors

Technique: Step back into a lunge position with one leg. Roll into the ball of the back foot and press gently through the front of the extended hip until a gentle stretch is felt. Hold for 15-30 seconds. Repeat on other side.



Gastrocnemius

Technique: Stand with one leg forward and other leg back in a lunge stance. Bend the front knee, while simultaneously pressing down and away with the heel of the back leg, until a gentle stretch is felt in the lower part of the back leg. Hold for 15-30 seconds. Repeat on opposite side.

Torso Stretches

Standing Erector Spinae (Low Back)

Technique: Stand with feet hip distance apart. Place palms on tops of thighs. Gently round the upper back by spreading the scapula and tilting the pelvis back. Keep the chin tucked to the chest throughout the movement. Feel a gentle stretch through the muscles of the spine. Hold for 15-30 seconds.



Supine Erector Spinae (Low Back)

Technique: Lie in a supine position on the floor or mat. Pull knees toward chest with hands on back of thighs until a gentle stretch is felt through the low back. Hold 15-30 seconds.

Lying Side Twist

Technique: Lie on back with knees bent. Extend arms to sides with hands in line with the shoulders. Inhale to prepare. Exhale and gently lower both knees to right. Hold for 15-30 seconds. Repeat on other side.



Abdominals (Trunk Extension)

Technique: Lie in prone position on mat. Place hands under shoulders with palms pressing into the mat, elbows pulling in close to sides of the body. Inhale to prepare. Exhale while gently lifting upward through the chest, keeping chin tucked to chest, until a gentle stretch is felt in abdominal muscles. Hold 15-30 seconds. To avoid potential injury to the lower back, avoid pressing the torso up by extending arms fully when lifting chest.



Below are a series of questions designed to help you efficiently remember the course material. Before proceeding to the next page of the course content, please answer the following review questions.

Section #14 Review Questions

1. List the appropriate stretch for each of the following described body parts and list the plane of movement in which each stretch occurs:
 - Front of Thigh:

 - Back of Thigh:

 - Upper Back:

 - Shoulders:

2. What is a good stretch for someone who has tight abdominals and a weak lower back?

3. What is a good stretch for the low back?

Specialized Weight Management Program—Design

Many individuals seek out a personal trainer with the primary fitness goal of weight loss. The top two primary reasons for obesity of individuals in the U.S. are (1) inactivity; and (2) excessive energy (caloric) intake. An increase in physical activity and a decrease in caloric intake will result in weight loss.

ACSM recommends the following exercise guidelines for weight loss:

- Frequency: Aerobic activity 5 to 7 days per week.
- Intensity: Initially moderate (40-60% HRR) with progression to higher intensity (50-75% HRR).
- Duration: Progress from short duration to 45 to 60 minutes per day.

ACSM recommends that the following safety guidelines be followed when creating an exercise prescription for overweight and de-conditioned individuals:

- Focus on low-impact activities (water exercise, cycling, walking, elliptical trainer).
- Due to excess adipose tissue, overweight/obese individuals may have problems keeping their body cool during physical activity. Choose to exercise at cooler times during the day or in a temperature-controlled environment. Encourage clients to drink adequate amounts of water.
- Include resistance training to increase the metabolic rate, which will result in more calories burned throughout the day.
- Set a weight loss goal of 1-2 pounds per week. To achieve this goal, an individual will need to create a caloric deficit of 3,500 calories per week (1 pound of weight loss) to 7,000 calories per week (2 pound of weight loss). A goal of one-pound per week weight loss will mean that your client will need to create 500 calorie deficit each day of the week. This can be achieved by burning 300 calories per day through physical activity plus a reduction of 200 calories of food intake per day.

Case Study—Design a Weight Loss Program for a Client

Mary is a 32 year-old stay-at-home mom who can exercise while her children are in pre-school from 9am-12pm each day. She is 5'2" tall, weighs 200 pounds, and has a body fat percentage of 32. Take a few moments to write goals you would suggest for Mary in the space provided below. Include an exercise prescription for Mary along with dietary advice you would provide based on the nutritional information contained on pages 22-25.

FiTOUR®

Primary Personal Trainer

Personal Training Forms



Permission is given by FiTOUR® to copy the following forms to
use for Personal Training.

➤ Appendix A: Borg's Scale of Rating of Perceived Exertion

Original Scale	
6	No Exertion at All
7	Extremely Light
8	
9	Very Light
10	
11	Light
12	
13*	Somewhat Hard
14*	
15*	Hard (Heavy)
16*	
17	Very Hard
18	
19	Extremely Hard
20	MAX

Revised Scale	
0	
.5	Extremely Weak
1	Very Weak
2	Weak
3	Moderate
4*	
5*	Strong
6*	
7	Very Strong
8	
9	
10	Extremely Strong (MAX)

*The intensity level that is optimal for cardiovascular improvements.

➤ Appendix B: Other Body Composition Testing

BMI: Body Mass Index

- Formula: $\text{Weight in Pounds} \div \text{Height in Inches}^2 \times 703 = \text{BMI}$
- Chart

BODY MASS INDEX (kg/m2)

	19	20	21	22	23	24	25	26	27	28	29	30	35	40
Height (Inches)	Body Weight (Pounds)													
58	91	96	100	105	110	115	119	124	129	134	138	143	167	191
59	94	99	104	109	114	119	124	128	133	138	143	148	173	198
60	97	102	107	112	118	123	128	133	138	143	148	153	179	204
61	100	106	111	116	122	127	132	137	143	148	153	158	185	211
62	104	109	115	120	126	131	136	142	147	153	158	164	191	218
63	107	113	118	124	130	135	141	146	152	158	163	169	197	225
64	110	116	122	128	134	140	145	151	157	163	169	174	204	232
65	114	120	126	132	138	144	150	156	162	168	174	180	210	240
66	118	124	130	136	142	148	155	161	167	173	179	186	216	247
67	121	127	134	140	146	153	159	166	172	178	185	191	223	255
68	125	131	138	144	151	158	164	171	177	184	190	197	230	262
69	128	135	142	149	155	162	169	176	182	189	196	203	236	270
70	132	139	146	153	160	167	174	181	188	195	202	207	243	278
71	136	143	150	157	165	172	179	186	193	200	208	215	230	286
72	140	147	154	162	169	177	184	191	199	206	213	221	258	294
73	144	151	159	166	174	182	189	197	204	212	219	227	265	302
74	148	155	163	171	179	186	194	202	210	218	225	233	272	311
75	152	160	168	176	184	192	200	208	216	224	232	240	279	319
76	156	164	172	180	189	197	205	213	221	230	238	246	287	328

- Norms
 - o Underweight = <18.5
 - o Normal weight = 18.5 - 24.9
 - o Overweight = 25 - 29.9
 - o Obesity = 30 or greater

WHR: Waist to Hip Ratio

- Formula

$$\frac{\text{Waist Girth Measurement in Inches}}{\text{Hip Girth Measurement in Inches}} = \text{WHR}$$

- Norms

Male	Female
Excellent <0.85	Excellent <0.75
Good 0.85 - 0.90	Good 0.75 - 0.80
Average 0.90 - 0.95	Average 0.80 - 0.85
High 0.95 - 1.00	High 0.85 - 0.90
Extreme > 1.00	Extreme > 0.90

➤ **Appendix C: Pre-Fitness Assessment Instructions**

Before participating in the Fitness Assessment, please take a moment to review and follow the below pre-fitness assessment instructions. Following the pre-fitness instructions will increase testing validity and accuracy.

1. Refrain from ingesting food, alcohol, or caffeine or using tobacco products within three hours of testing.
2. Be well rested for the assessment avoiding significant exertion of exercise on the day of the assessment.
3. Wear comfortable clothing that allows movement and ventilation. Avoid restrictive underclothing. Please wear proper footing such as walking or running shoes.
4. If on medication, continue to take according to your physician's advice so that the exercise responses will be consistent with responses expected during exercise training.
5. If on medications and you have your physician's permission to participate within the fitness assessment, please bring a list of medications along with information regarding dosage and frequency of administration.
6. Be U-hydrated: Avoid drinking too much water before testing and too little water before testing.
7. Notify emergency contact person prior to the day of testing for safety purposes.
8. Please feel free to ask any questions prior to testing.

Fitness Assessment Tests

- Resting Heart Rate
- Blood Pressure Reading
- Body Composition: One or more of the following
 - o Skinfold Caliper Measurement
 - o BMI
 - o Waist to Hip Ratio
 - o Bioelectrical Impedance
- Three-minute Step Test (Cardiorespiratory Fitness)
- Sit and Reach Test (Flexibility)
- Muscular Strength: One of the following
 - o Leg Press Test
 - o Bench Press Test
 - o Dynamometer
- Muscular Endurance: One of the following
 - o Push-up Test
 - o Half Sit-up Test

Date and Time of Fitness Assessment _____

➤ **Appendix D: Informed Consent**

I hereby voluntarily give consent to engage in a fitness test. I understand that the cardiovascular fitness test will involve progressive stages of increasing effort and that at any time I may terminate the test for any reason. I understand that during some tests I may be encouraged to work at maximum effort and that at any time I may terminate the test for any reason.

I understand there are certain changes which may occur during the exercise test. They include abnormal blood pressure, fainting, disorders of heartbeat, and very rare instances of heart attack. I understand that every effort will be made to minimize problems by preliminary examination and observation during testing.

I understand that I am responsible for monitoring my own condition throughout testing, and should any unusual symptoms occur, I will cease my participation and inform the test administrator of the symptoms. Unusual symptoms include, but are not limited to: chest discomfort, nausea, difficulty in breathing, and joint or muscle injury.

Also, in consideration of being allowed to participate in the fitness tests, I agree to assume all risks of such fitness testing, and hereby release and hold harmless _____, and their agents and employees, from any and all health claims, suits, losses, or causes of action for damages, for injury or death, including claims for negligence, arising out of or related to my participation in the fitness assessments.

I have read the foregoing carefully and I understand its content. Any questions which may have occurred to me concerning this informed consent have been answered to my satisfaction.

Name:	Date:
Witness:	Date:

➤ **Appendix E: PAR-Q Form****Physical Activity Readiness Questionnaire**

Name _____ Date _____

DOB _____ Age _____ Home Phone () _____ Work Phone () _____

Regular exercise is associated with many health benefits, yet any change of activity may increase the risk of injury. Completion of this questionnaire is a first step when planning to increase the amount of physical activity in your life. Please read each question carefully and answer every question honestly:

Y	N	1. Has a physician ever said you have a heart condition and you should only do physical activity recommended by a physician?
Y	N	2. When you do physical activity, do you feel pain in your chest?
Y	N	3. When you were not doing physical activity, have you had chest pain in the past month?
Y	N	4. Do you ever lose consciousness or do you lose your balance because of dizziness?
Y	N	5. Do you have a joint or bone problem that may be made worse by a change in your physical activity?
Y	N	6. Is a physician currently prescribing medications for your blood pressure or heart condition?
Y	N	7. Are you pregnant?
Y	N	8. Do you have insulin dependent diabetes?
Y	N	9. Are you 69 years of age or older?
Y	N	10. Do you know of any other reason you should not exercise or increase your physical activity?

If you answered yes to any of the above questions, talk with your doctor **BEFORE** you become more physically active. Tell your doctor your intent to exercise and to which questions you answered yes.

If you honestly answered no to all questions you can be reasonably positive that you can safely increase your level of physical activity gradually.

If your health changes so you then answer yes to any of the above questions, seek guidance from a physician.

Participant's Signature _____ Date _____

➤ Appendix F: Letter to Physician

Dear Doctor:

Your patient, _____, wishes to begin a personalized training program involving progressive resistance training, flexibility exercises, and a cardiovascular program; increasing in duration and intensity over time. After completing a Modified PAR-Q and discussing their medical condition, we agreed to seek your advice in setting limitations to the program. Please identify any recommendations or restrictions that are appropriate for your patient in this exercise program:

	I am not aware of any contraindications toward participation in a fitness program.
	The applicant should not engage in the following activities:
	I recommend the applicant not participate in the above fitness program.

Physician's Name (Please Print) _____

Address _____

City, State, Zip _____, _____, _____

Phone Number () _____ Email Address _____

Physician's Signature

Date

➤ **Appendix G: Fitness Assessment Results**

Name _____ Date _____

Address _____

City _____ State _____ Zip _____

Home Phone _____ Cell Phone _____

E-mail _____

TEST	RESULTS	GOAL
Pre-Fitness Assessment Instructions	YES/NO	NA
Informed Consent Form Completed	YES/NO	NA
PAR-Q Form Completed	YES/NO	NA
Physician's Letter Completed	YES/NO/NA	NA
Resting Heart Rate		
Resting Blood Pressure		
Body Fat Percentage		
Cardiorespiratory Fitness		
Flexibility		
Muscular Strength		
Muscular Endurance		

Exercise Prescription

Cardio:

Weight Training:

Flexibility:

Nutrition/Weight Management:

RE-TEST DATE: _____

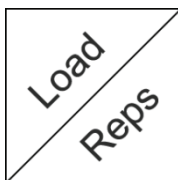
➤ Appendix H: Personal Trainer Checklist

Client: _____

✓	Date Completed	Procedure
		Initial Consultation
		Provided Pre-Fitness Assessment Instructions
		Sent Letter to Physician (if applicable)
		Assessment of the Five Components of Fitness
		-Informed Consent Form
		-PAR-Q Form
		-Received Letter to Physician (if applicable)
		-Resting Heart Rate
		-Resting Blood Pressure
		-Body Composition Test
		-Cardiorespiratory Fitness Test
		-Flexibility Test
		-Muscular Strength Test
		-Muscular Endurance Test
		Review Fitness Assessment Results and Goals with Client
		Design Basic Six-Week Exercise and Weight Management Program
		-Cardio Program
		-Weight Resistance Training Program
		-Flexibility
		-Specialized Weight Management Program
		Train Client for Six Weeks Making Needed Program Adjustments
		Re-test Client

➤ Appendix I: Program Design Chart

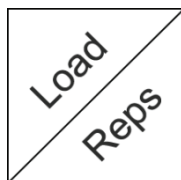
Weight Training	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date
Lift a load that will illicit 12-15 Reps.	# Sets 1	# Sets 2	# Sets 2	# Sets 2	# Sets 3	# Sets 3	# Sets 3	# Sets 3	# Sets 3	# Sets 3	# Sets 3	# Sets 3
Pectorals												
Rhomboids												
Shoulders												
Lats												
Biceps												
Triceps												
Quads												
Hamstrings												
Glutes												
Erector Spinae												
Abdominals												
Cardio												
Flexibility												
Nutritional Goals												



- 1) Within the diagonal box for each muscle, write the amount of weight lifted (load) in the top section and write the number of reps completed in the bottom section.
- 2) Make a checkmark in the Cardio and Flexibility Boxes if completed that day.
- 3) Write any nutritional reminders.

➤ Appendix I: Program Design Chart 2

Weight Training	Date	Date	Date	Date	Date	Date	After Week 6, adjust weight training workout to a more specialized program.					
Lift a load that will illicit 12-15 Reps.	# Sets 1	# Sets 2	# Sets 2	# Sets 2	# Sets 3	# Sets 3						
Pectorals												
Rhomboids												
Shoulders												
Lats												
Biceps												
Triceps												
Quads												
Hamstrings												
Glutes												
Erector Spinae												
Abdominals												
Cardio												
Flexibility												
Nutritional Goals												



- 1) Within the diagonal box for each muscle, write the amount of weight lifted (load) in the top section and write the number of reps completed in the bottom section.
- 2) Make a checkmark in the Cardio and Flexibility Boxes if completed that day.
- 3) Write any nutritional reminders.

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