Primary Personal Trainer Certification Course

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Quality Fitness Education at an Affordable Price!

3rd Edition

TABLE OF CONTENTS

Objective 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 qualified fitness professional who is 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 workout on his/her own.

Qualifications of a Personal Trainer
- Education
    - Current nationally recognized personal trainer certification.
    - Some formal education in physiology, kinesiology/biomechanics, anatomy, and health promotion.
    - CPR/First Aid.
    - 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.

Objective of Personal Training

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 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.
  - Engages in full conversations with other people during a client’s training session.
  - Fail to return phone messages or e-mails.

Objective of Personal Training

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 a Meagan, a certified personal trainer at the club who has been Pilates certified for 10 years. Meagan 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 schedules the first appointment with Sue Ann for the following week. After meeting with SueAnn, John seeks advice from Meagan 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:

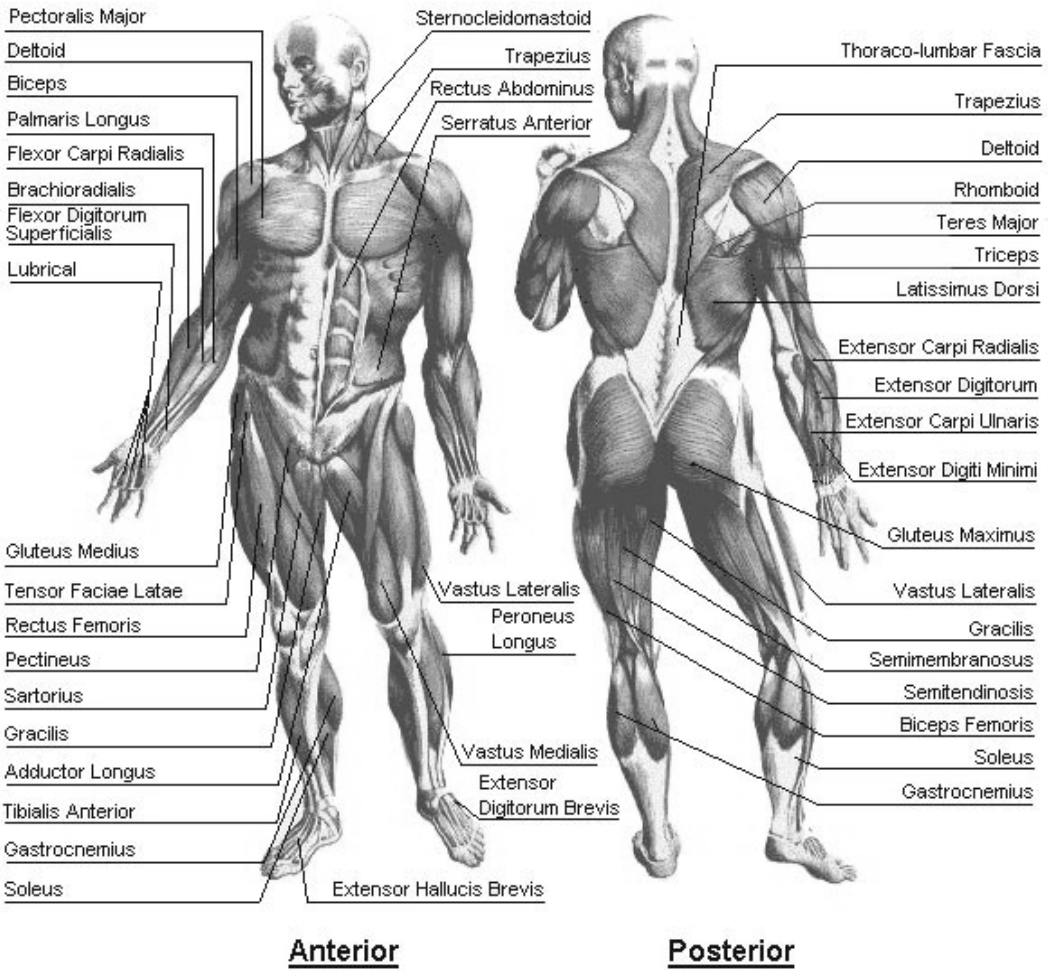
Exercise Science
Anatomy

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.

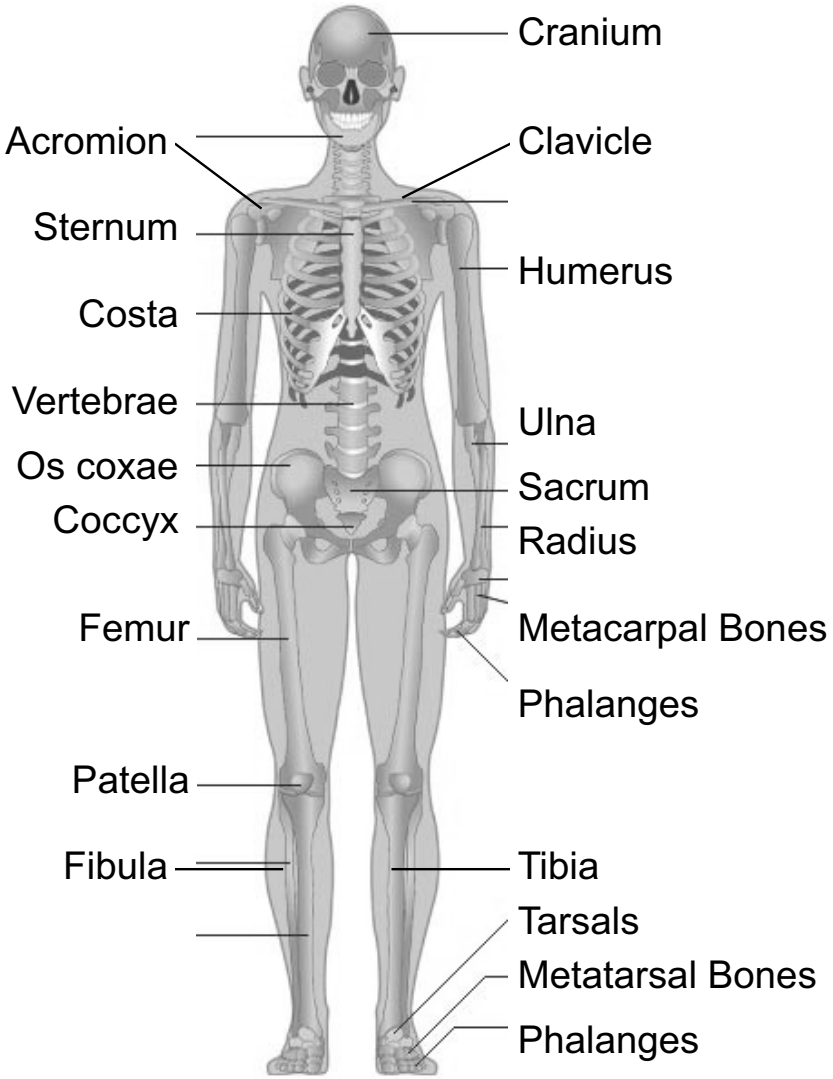
Muscular Anatomical Figure



Exercise Science
Anatomy

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

Skeletal Anatomical Figure



Exercise Science
Anatomy

- **Joint:** The point at which two or more bones come together or make contact.
- **Arthrology:** The study of joints.
- **Articulation:** Movement at a joint.

    - Diarthrodial Joint or Diarthrosis (Moveable Joints): A joint that has an articular cavity or separation present to allow movement.

        - 5 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
            - Irregular: Example locations are carpals and tarsals.
            - Hinge: Example locations are humerus and ulna.
            - Pivot: Example locations are humerus and radius.
            - Condyloid (True Wrist): Example location is radiocarpal (joint of the wrist).
            - Saddle: Example location is first carpometacarpal (joint of the thumb).
            - Ball & Socket: Example locations are shoulder and hip.

    - Synarthrodial Joint or Synarthrosis (Non-Moveable Joints): A joint that does not have an articular cavity or separation present to allow movement.

        - 3 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 6 bones in the pelvic girdle.
            - Ligamentous: Mid-union of the forearm between the ulna and radius.

Exercise Science
Physiology

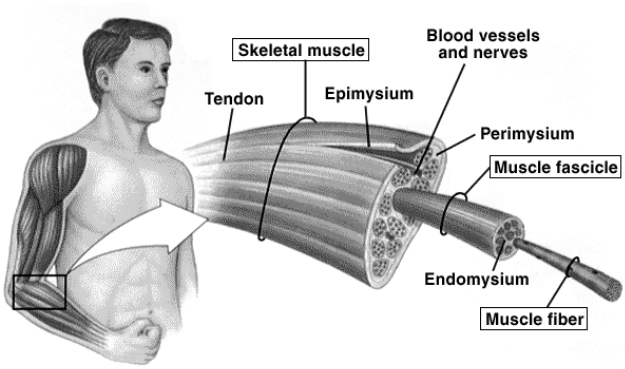
Definition: Physiology is the study of human body function.

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

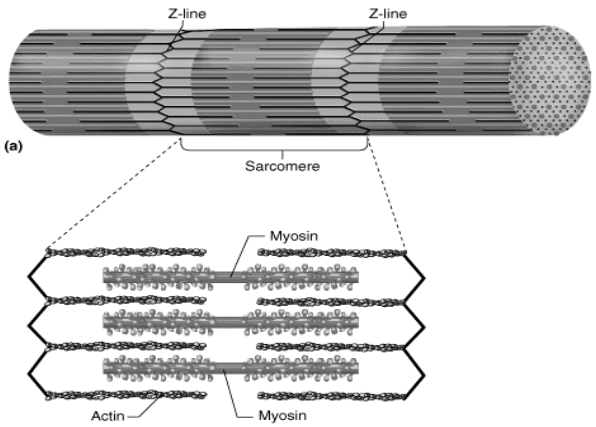
- Each muscle contains three layers of connective tissue:
  - Epimysium: located in the outer layer of the muscle.
    - A dense layer of collagen fibers that surround the entire muscle and which separate the muscle from surrounding tissue and organs.



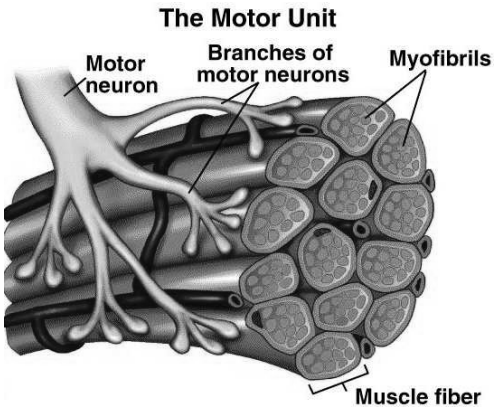
  - Perimysium: located in the center of the muscle.
    - Connective tissue fibers which divide the skeletal muscle into a series of compartments which each contain a bundle of muscle fibers (fascicle).
    - Contains blood vessels and nerves which maintain blood flow and innervate the fascicle.
  - Endomysium: 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 epimyseum, perimyseum and endomyseum 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.

Exercise Science
Physiology

- Myofibrils: Microscopic proteins bundled together to form a myofibril.
  - 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.



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



Exercise Science
Physiology

Muscle Contraction

- Contraction: A muscle action which is required for every human activity apart from thinking.
    - A contraction is initiated by impulses (action potentials).
    - Impulses are sent through the central nervous system by way of a motor neuron (neural cell).
    - 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.
    - 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:
    - 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.
    - Eccentric Phase: A lengthening of muscle during its contraction which results in an increase in the joint angle. A triceps pressdown 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 isokentic 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.

Exercise Science
Physiology

Three Muscle Fiber Types

There are three types of muscle fibers found in a muscle. The exact mix of fibers are genetically determined for each individual. This explains why some clients can run faster than others while the slow runners may be able to run for longer durations than others.

- Slow Twitch (Type I):
  - Slow twitch fibers are recruited for aerobic activity.
    - Contract slowly and are very resistant to fatigue.

- Fast Twist (Type II):
  - 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:
  - 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.

  - 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 varies from individual to individual and are genetically determined. The type of muscle fiber recruited for a specific activity can be trained specifically. Also, 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.

Exercise Science
Physiology

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 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:
    - Best suited for endurance activities, aerobic training and muscular endurance.
    - 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:
    - Best suited for activities involving speed, power and strength.
    - 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.

Exercise Science
Physiology

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

  - 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.
  - Oxygen Uptake: The rate at which oxygen is utilized during a specific level of an activity.
  - Oxygen Deficit: The difference between the theoretical oxygen requirement of a physical activity and the measured oxygen uptake.
  - Steady State: The point during exercise at which oxygen uptake is unchanging or changes very little.
  - Oxygen Debt or Excess Postexercise Oxygen Consumption (EPOC): The amount of oxygen used during recovery from work that exceeds the amount needed for rest.
  - VO_2max: The greatest rate of oxygen utilization attainable during heavy work. Expressed in L-min^{-1} or ml-kg^{-1}-min^{-1}.
  - Heart Rate: The number of beats of the heart per minute.
  - Stroke Volume: The amount of blood pumped in one beat of the heart.
  - Cardiac Output: The amount of blood circulated by the heart in one minute.
    Formula Expressed as Heart Rate X Stroke Volume = Cardiac Output
  - Blood Pressure: The pressure exerted by the blood on the vessel walls, measure in milliliters of mercury by the sphygmomanometer.
  - Pulmonary Ventilation: The process of oxygenating the blood through the lungs.
  - 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:
    - Increase in number of mitochondria (The “powerhouse of cells”).
    - Decreased time that it takes to achieve steady state.
    - Size of the ventricle of the heart increases, increasing the amount of blood that can be pumped with one beat of the heart.
    - 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	Blood Pressure	Oxygen Deficit
Oxygen Debt	Articulation	Hinge Joint
Stroke Volume	Joint	Pivot Joint
Lactate Threshold	Synovial Membrane	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 _____.

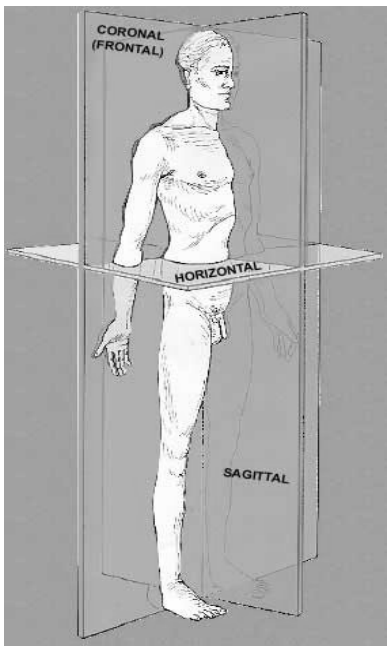
7. _____ is the functional unit of muscular contraction.

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

Exercise Science
Kinesiology

- **Joint Actions**
  - Flexion: The movement of a limb caused by concentric muscular contraction, resulting in a decrease in the angle of a joint.
  - Extension: The movement of a limb caused by eccentric muscular contraction, resulting in an increase in the angle of a joint.
  - Hyperextension: A continuation of extension past the normal anatomical position.
  - Lateral Flexion: Flexing to the side (Usually an action of the vertebral column).
  - Dorsiflexion: Flexion of the ankle joint bringing the top of the foot towards the shin.
  - 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.
  - Abduction: Within the anatomical position, movement of a bone/bones laterally away from the midline of the body.
  - Adduction: Within the anatomical position, movement of a bone/bones towards the midline of the body.
  - Rotation: Movement around an axis.
  - Internal Rotation: Rotation of a joint inward towards the midline of the body.
  - External Rotation: Rotation of a joint outwards away from the midline of the body.
  - 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.
  - Elevation: Upward movement/action of the scapula.
  - Depression: Downward movement/action of the scapula.
  - Protraction: Abduction of the scapula.
  - Retraction: Adduction of the scapula.
  - Pronation (eversion): The positioning of the hand with the palm facing down. The inward rotational roll position of the foot.
  - Supination (inversion): The positioning of the hand with the palm facing up. The outward rotational roll position of the foot.
  - 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.
  - Anterior Tilt: An arching of the lower back that causes the pelvis to tilt towards the front of the body.
  - Posterior Tilt: A rounding of the lower back that causes the pelvis to tilt towards the back of the body.

Exercise Science
Kinesiology

- **Anatomical Directional Terminology**
  - Anterior: In front or in front of the body.
  - Posterior: Behind, in back, or in the rear.
  - Prone: The body lying face downward.
  - Supine: Lying on the back, face upward position of the body.
  - 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.
  - Lateral: On or to the side, outside, farther from the median or midsagittal plane.
  - Medial: Relating to the middle or center, nearer to the medial or midsagittal plane.
  - Proximal: Nearest the trunk or the point of origin.
  - Distal: Situated away from the center or midline of the body, or from the point of origin.
  - Superior (Supra): Above in relation to another structure, higher.
  - Inferior (Infra): Below in relation to another structure, lower.

- **General Biomechanical Concepts**
  - 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.
  - Rotational Inertia: Reluctance to rotate; proportional to the mass and distribution of the mass around the axis.
  - Torque: The effect produced by a force causing rotation; the product of the force and length of force arm (perpendicular distance from the axis)
  - Angular Momentum: The quantity of rotation. Angular momentum is the product of the rotational inertia and angular velocity.

- **Newton's 3 Laws of Motion**
  - 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.
  - 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.
  - Reaction: For every action there is an equal and opposite reaction.

Risk Factors
For Coronary Heart Disease (CHD)*

Primary Risk Factors

- Age—Men>45 years/Women>55 years.
- Family History
- Smoking
- High total cholesterol—CHL>200 mg/dl.
- High low-density cholesterol.
- Low high-density cholesterol HDL<35 mg/dl.
- Hypertension (High blood pressure) - Blood Pressure>140/90.
- Physical inactivity.
- Diabetes

Secondary Risk Factors

- Obesity
- High very-low density cholesterol.
- Inability to cope with stress.
- African-American male.
- Low level of cardiorespiratory fitness.
- High fat diets.

Major Symptoms of Cardiopulmonary Disease

- Pain, discomfort in the chest, neck, jaw, arms, or other areas that may be ischemic in nature.
- Shortness of breath at rest.
- Dizziness
- Orthopnea or paroxysmal nocturnal dyspnea.
- Ankle edema.
- Palpitations or tachycardia.
- Intermittent claudication.
- Known heart murmur.
- Unusual fatigue.

Initial Risk Stratification

- Apparently Healthy—Individuals who are asymptomatic and apparently healthy with no more that one primary coronary risk factor.
- Increased Risk—Individuals who have signs or symptoms suggestive of possible cardiopulmonary or metabolic disease and/or two or more primary risk factors.
- Known Disease—Individuals with known cardiac, pulmonary, or metabolic disease.

FiTOUR® recommends that individuals who are stratified within the *Increased Risk* or *Known Disease* categories, they should medically examined and tested before beginning a personal training program.
*Information provided by ACSM Guidelines for Exercise Testing and Prescription.

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 #3 Review Questions

1. _____ is the scientific study of human movement.

2. _____ is a vertical plane that passes through the body anterior to posterior dividing the body into right and left sections. _____ and _____ movements occur within this plane.

3. _____ cause movement at a joint in a direction opposite to that the prime mover.

4. The _____ are the muscles that keep the joint steady while the prime mover applies force to a neighboring joint.

5. Provide a definition and give an example of a muscle action that produces the movement for the following words:

Abduction:

Extension:

Flexion:

6. What are 3 primary risk factors for coronary heart disease that cannot be altered with lifestyle changes?

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 one's 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 Force X Speed = 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.

Exercise Principles

FITT Principles: The 4 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
  - Frequency: 3-5 Days a Week
  - Intensity
    - Guidelines for Monitoring Intensity
      - 60%-90% of MHR (Age Predicted Maximum Heart Rate)
      - 50%-85% of VO_2max or HRR (Heart Rate Reserve)
    - Measuring Intensity
      - Taking a Pulse: Target Heart Rate Zone (THRZ)
        - Either at neck (carotid artery) or wrist (radial artery)
        - Take for 10 seconds and multiply by 6
        - Age Predicted Maximum Heart Rate
          220-Age=MHR
          MHR X .60 = Low end of THRZ
          MHR X .90 = Upper end of THRZ
          Target Heart Rate Zone is within 60-90%
        - Karvonen Formula
          220-Age=MHR
          MHR-Resting Heart Rate=HRR
          HRR X .50 + Resting Heart Rate = Low end of THRZ
          HRR X .85 + Resting Heart Rate = Upper end of THRZ
          Target Heart Rate Zone is within 50-85%
      - Perceived Exertion (See Appendix A)
        - Borg's Original Rating of Perceived Exertion
        - Borg's Revised Rating of Perceived Exertion
      - Talk Test
        - Intensity is too high– If one cannot speak.
        - Intensity is too low– If one can sing songs and make long speeches.
        - Optimal Intensity– One should be breathing heavily and be able to speak in short phrases.
  - Time
    - 20-60 minutes of continuous vigorous activity.
    - When just beginning, do as much as can be tolerated.
  - Type
    - Select activities the client will enjoy.

Exercise Principles

Exercise Guidelines (continued)

- Resistance Training
  - Frequency: Minimum 2 days/week.
  - Intensity: 8-10 Major Muscles.
  - Time: 8-12 Reps/1-2 Sets.
    For continued muscular development increase to 3 sets and heavier load.
  - Type: Choose free weights or resistance machines.
- Flexibility
  - Frequency: At least 3 days/week or after every workout.
  - Intensity: Stretch all major muscles to the point of mild discomfort.
  - Time: Hold each stretch 15-30 seconds/Repeat each stretch 3-5 sets.
  - 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 Principles

Exercise Safety Guidelines

- **General Safety Tips**
  - Always consult a physician before beginning a new exercise program.
  - Warm up and cool down before and after every workout.
  - Avoid exercising in extreme temperatures (hot or cold) and humidity.
  - Take days off during the week to rest and repair the body.
  - Wear proper clothing and footwear.
  - Drink water before, during, and after exercise.
  - Maintain heart-rate within the target heart rate during exercise.
  - If one has a special health condition, take medication as prescribed by the doctor.
  - 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**
  - Choose a modality that does not impose significant orthopedic stress.
  - The activity should be convenient and fun—stressing social aspects.
  - Emphasize programs that will enhance functional strength and flexibility thereby enhancing one's ability to lead an independent lifestyle.
  - Incorporate cardio activity.
  - Incorporate resistance training that focuses on muscular health and endurance emphasizing all major muscle groups.
  - Incorporate a flexibility program.

- **Youth**
  - Incorporate consistent but fun exercise program.
  - Children are more apt to adapt to a cardio exercise program that emulates that way children play. For example, intermittent bouts of cardio activity within a session models after children play tag.
  - Incorporate a light resistance training program that incorporates tubing or light weights that will illicit a rep range of about 20. Limit resistance training to 2 days a week.
  - Incorporate a flexibility program.
  - Teach proper eating habits.
  - Use multi-joint rather than single-joint exercises.
  - Children overheat much faster and are more prone to heat injuries than adults.

Exercise Principles

- **Pregnant Women**
  - Discuss first with the physician an exercise plan of action.
  - Exercise at least 3 days a week.
  - Perform a longer warm-up (10-15 minutes).
  - Pregnant women should listen to their bodies and adjust the intensity accordingly.
    - Cease activity if fatigued and do not exercise to exhaustion.
    - Use the talk test or RPE scale to monitor intensity.
    - Aqua aerobics is recommended with pool temperature between 80-84°.
    - Drink water before, during, and after exercise.
  - Avoid exercising to exhaustion.
  - Exercise in the supine position should be avoided after the first trimester.
  - As part of the muscle conditioning, perform pelvic floor strengthening (Kegel) exercises.
  - Avoid deep stretches.
  - Consume 300 more calories per day and possibly more depending on level of activity.

- **Asthma**
  - 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.
  - Avoid exercise in a cold, dry environment.
  - One may choose an aquatic exercise program. The warm, humid air in an aquatic setting makes it easier for one to breathe.
  - Perform a longer warm-up.
  - Interval training is optimal.
  - Avoid eating at least 2 hours prior to exercise.
  - Take prescribed medication prior to exercise.
  - Have a bronchodilator on hand.
  - Exercise with a buddy in case of an incident.

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

Exercise Principles

- **Diabetes**
  - 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.
  - 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.
  - 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 VO_2 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**
  - Avoid exercise when the joint is inflamed.
  - Avoid exercise in the morning. This is when an individual has the least amount of mobility.
  - Perform a longer warm-up to increase the viscosity of the joint due to synovial fluid being released.
  - Move all joints through full range of motion including fingers and toes.
  - Perform exercises gently with little to no bounding.
  - Personal trainers should consider an aqua exercise program for these clients, keeping the water temperature between 86-90°.
  - Incorporate a well-rounded exercise program that incorporates cardio, resistance training, and flexibility.

Exercise Principles

- **Osteoporosis**
  - A disease characterized by a decrease in the total amount of bone mineral and a decrease in the strength of the remaining bone.
  - 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**
  - Incorporate resistance training to strengthen the ligaments and tendons that support the knee and hip.
  - Keep the movements fluid; avoid jerky, rushed movement.
  - Avoid twisting while keeping the feet planted on the floor.
  - Keep knees flexed.
  - Individuals with hip replacement should avoid crossing one leg over the other. Avoid hip flexion beyond 90°.

- **Low Back Problems**
  - Avoid bounding movements.
  - Avoid hyperextension of the lower back.
  - Strengthen abdominals.
  - Develop core strength.
  - Maintain neutral spine.
  - Stop if an exercise is painful.
  - Teach client proper lifting techniques.

- **Athletes**
  - Provide a variety of activities that offer a challenge.
  - Incorporate plyometric moves and interval training.
  - Incorporate games.

- **Obesity**
  - Encourage a complete program of diet and exercise for weight loss.
  - Personal trainers should place importance on health as opposed to physical appearance.
  - Exercise 3-5 days/week.
  - Exercise for longer durations.
  - Avoid high impact moves.
  - Wear protective footwear.
  - Personal trainers may want to recommend water exercise for a combination of cardio and resistance training.

Exercise Principles

- **Injury Prevention**
  - Increase training gradually.
  - Alternate more aggressive training days with less aggressive training days.
  - Get plenty of sleep.
  - Eat a healthy diet.
  - Make adjustments to 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 stroke, the trainer should emphasize large muscle - _____ movement performed at _____ intensities (_____% of MHR) for _____durations.

4. _____, which can often be controlled with life-style 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

7 Nutrients

- **Carbohydrates (Energy Yielding Nutrient)**
  - Function: Body's primary source of energy.
  - Stored as glycogen in liver and muscles.
  - 4 calories per 1 gram of carbohydrate.
  - Categories of Carbohydrates:
    - Complex
      - Whole Grain Breads, Cereals, Pastas, Flour.
      - Vegetables
      - Fruits
    - Simple
      - Syrups
      - Jellies
      - Cakes
  - **55%-60%** of daily caloric intake should come from carbohydrates.

- **Fats (Energy Yielding Nutrient)**
  - Function: Involved in the maintenance of healthy skin, insulation against heat and cold, protection of vital organs, major storage form of energy.
  - Stored in fat cells around organs and within the adipose tissue.
  - 9 calories per 1 gram of fat.
  - 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
  - **20%-30%** of daily caloric intake should come from fats.
  - Less than 10% of Fat intake should come from saturated fats.

- **Proteins (Energy Yielding Nutrient)**
  - Function: The building blocks of the cells within the body. They repair, rebuild, and re-place cells. They also regulate bodily processes involved in fighting infection.
  - The most simple form of protein is amino acid and cannot be stored within the body.
  - 4 calories per 1 gram of protein.
  - Categories of amino acids (20 total amino acids):
    - 9 Essential Amino Acids: Must be supplied through diet.
      - Complete Protein: Foods that contain all 9 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).
    - 11 Non-Essential Amino Acids: Produced by the body.
  - **10%-15%** of daily caloric intake should come from protein.

Basic Nutrition and Weight Management

- **Fiber**
  - 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 carry harmful substances out of the body, thus aiding in the prevention of heart disease and cancer.
  - Is not stored.
  - Zero calories.

- **Vitamins**
  - Function: Vitamins (13) are responsible for many bodily processes.
  - 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.
  - Zero calories.

- **Minerals**
  - Function: Builders, activators, regulators, transmitters, and controllers of the body's metabolic processes. Work with vitamins for absorption into the body.
  - Are not stored.
  - Zero calories.

- **Water**
  - Function: Provides the medium for and is an end product of activity. Water is important for efficient metabolism.
  - Represents 40%-60% of an individual's total body weight.
  - Makes up about 72% of the weight of muscle.
  - Zero calories.
  - One should consume at least 64 ounces of water per day.

Supplements/Ergogenic Aids

- It is recommended that one focuses 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.

Basic Nutrition and Weight Management

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 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 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 have 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.Choose**MyPlate**.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.

Basic Nutrition and Weight Management

Weight Management

- Maintaining Weight
  - Combining proper eating habits and regular exercise is the best method for managing weight.
  - Caloric intake = Caloric expenditure.
- Losing Weight
  - Goal: To increase lean mass while decreasing fat mass.
  - 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.
  - Weight Loss Rate
    - Lose weight at a rate of 1-2 pounds per week.
    - 1 lb 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
  - Goal: To increase lean mass. Some individuals will hire a personal trainer to help them gain muscle tissue/mass.
  - 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 1 lb 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 10 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
		Gave out Pre-Fitness Assessment Instructions (Appendix C)
		Sent Letter to Physician if Applicable (Appendix F)
		Assessment of the 5 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 6-Week Exercise and Weight Management Program (Appendix H)
		-Cardio Program
		-Weight Resistance Training Program
		-Flexibility
		-Specialized Weight Management Program
		Train Client for 6 Weeks Making Needed Program Adjustments
		Retest Client

5 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 5 Main Components of Fitness
–Body Composition
–Cardiorespiratory Fitness
–Flexibility (lower back and hamstrings)
–Muscular Strength
–Muscular Endurance

Sequence of Testing and Exercise Prescription
–Pre-Fitness Assessment Instructions (see Appendix C)
–Complete Informed Consent (see Appendix D)
–Complete PAR-Q Form (see Appendix E)
–Complete Letter To Physician if Applicable (see Appendix F)
–Resting Heart Rate and Blood Pressure
–Body Composition
–Cardiorespiratory Fitness Test
–Flexibility Test
–Muscular Strength Test
–Muscular Endurance Test
–Review Results and Set Goals
–Prescribe Exercise
–Retest every 3 months

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

Resting Heart Rate and Blood Pressure

Before testing the 5 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 to 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 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**

.

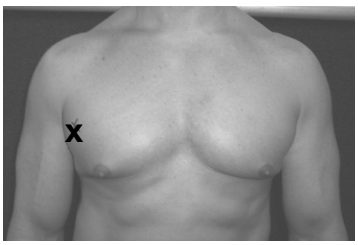
Measurements should be made on the right side of the body.
3 Site Skinfold Measurement
Male: Chest, Abdomen, Thigh
Women: Tricep, Iliac Crest, Thigh

- Caliper should be placed 1-2 cm away from the thumb and finger.
  - Perpendicular to the skin fold.
  - 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.
  - Between 1 to 2 seconds after lever has been released.
  - Per ACSM guidelines reading is given to the nearest mm.
- Take 2 measures 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.

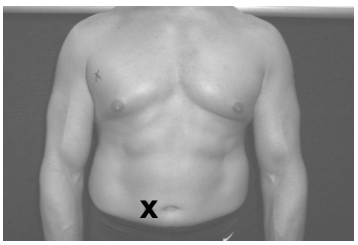
Body Composition

3 Site Skinfold Measurement

Men



Chest

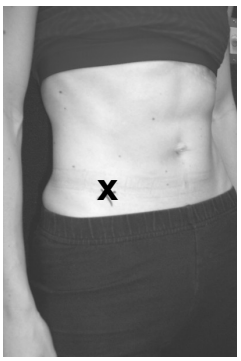


Abdominal

Thigh

Women

Tricep



Iliac Crest

Thigh

Percent Body Fat Estimations for Men --- Jackson and Pollock Formula

	Age Groups								
Sum of Skinfolds (mm)	**Under 22**	**23-27**	**28-32**	**33-37**	**38-42**	**43-47**	**48-52**	**53-57**	**Over 57**
8 - 10	1.3	1.8	2.3	2.9	3.4	3.9	4.5	5.0	5.5
11 - 13	2.2	2.8	3.3	3.9	4.4	4.9	5.5	6.0	6.5
14 - 16	3.2	3.8	4.3	4.8	5.4	5.9	6.4	7.0	7.5
17 - 19	4.2	4.7	5.3	5.8	6.3	6.9	7.4	8.0	8.5
20 - 22	5.1	5.7	6.2	6.8	7.3	7.9	8.4	8.9	9.5
23 - 25	6.1	6.6	7.2	7.7	8.3	8.8	9.4	9.9	10.5
26 - 28	7.0	7.6	8.1	8.7	9.2	9.8	10.3	10.9	11.4
29 - 31	8.0	8.5	9.1	9.6	10.2	10.7	11.3	11.8	12.4
32 - 34	8.9	9.4	10.0	10.5	11.1	11.6	12.2	12.8	13.3
35 - 37	9.8	10.4	10.9	11.5	12.0	12.6	13.1	13.7	14.3
38 - 40	10.7	11.3	11.8	12.4	12.9	13.5	14.1	14.6	15.2
41 - 43	11.6	12.2	12.7	13.3	13.8	14.4	15.0	15.5	16.1
44 - 46	12.5	13.1	13.6	14.2	14.7	15.3	15.9	16.4	17.0
47 - 49	13.4	13.9	14.5	15.1	15.6	16.2	16.8	17.3	17.9
50 - 52	14.3	14.8	15.4	15.9	16.5	17.1	17.6	18.2	18.8
53 - 55	15.1	15.7	16.2	16.8	17.4	17.9	18.5	19.1	19.7
56 - 58	16.0	16.5	17.1	17.7	18.2	18.8	19.4	20.0	20.5
59 - 61	16.9	17.4	17.9	18.5	19.1	19.7	20.2	20.8	21.4
62 - 64	17.6	18.2	18.8	19.4	19.9	20.5	21.1	21.7	22.2
65 - 67	18.5	19.0	19.6	20.2	20.8	21.3	21.9	22.5	23.1
68 - 70	19.3	19.9	20.4	21.0	21.6	22.2	22.7	23.3	23.9
71 - 73	20.1	20.7	21.2	21.8	22.4	23.0	23.6	24.1	24.7
74 - 76	20.9	21.5	22.0	22.6	23.2	23.8	24.4	25.0	25.5
77 - 79	21.7	22.2	22.8	23.4	24.0	24.6	25.2	25.8	26.3
80 - 82	22.4	23.0	23.6	24.2	24.8	25.4	25.9	26.5	27.1
83- 85	23.2	23.8	24.4	25.0	25.5	26.1	26.7	27.3	27.9
86 - 88	24.0	24.5	25.1	25.7	26.3	26.9	27.5	28.1	28.7
89 - 91	24.7	25.3	25.9	26.5	27.1	27.6	28.2	28.8	29.4
92 - 94	25.4	26.0	26.6	27.2	27.8	28.4	29.0	29.6	30.2
95 - 97	26.1	26.7	27.3	27.9	28.5	29.1	27.5	28.1	28.7
98 - 100	26.9	27.4	28.0	28.6	29.2	29.8	30.4	31.0	31.6
101 - 103	27.5	28.1	28.7	29.3	29.9	30.5	31.1	31.7	32.3
104 - 106	28.2	28.8	29.4	30.0	30.6	31.2	31.8	32.4	33.0
107 - 109	28.9	29.5	30.1	30.7	31.3	31.9	32.5	33.1	33.7
110 - 112	29.6	30.2	30.8	31.4	32.0	32.6	33.2	33.8	34.4
113- 115	30.2	30.8	31.4	32.0	32.6	33.2	33.8	34.5	35.1
116 - 118	30.9	31.5	32.1	32.7	33.3	33.9	34.5	35.1	35.7
119 - 121	31.5	32.1	32.7	33.3	33.9	34.5	35.1	35.7	36.4
122 - 124	32.1	32.7	33.3	33.9	34.5	35.1	35.8	36.4	37.0
125 - 127	32.7	33.3	33.9	34.5	35.1	35.8	36.4	37.0	37.6

Jackson, A.S. & Pollock, M.L. (1985). Practical assessment of body composition. Physician & Sports Medicine, 13, 76-90.

Percent Body Fat Estimations for Women --- Jackson and Pollock Formula

	Age Groups								
Sum of Skinfolds (mm)	**Under 22**	**23-27**	**28-32**	**33-37**	**38-42**	**43-47**	**48-52**	**53-57**	**Over 57**
23 -25	9.7	9.9	10.2	10.4	10.7	10.9	11.2	11.4	11.7
26 - 28	11.0	11.2	11.5	11.7	12.0	12.3	12.5	12.7	13.0
29 - 31	12.3	12.5	12.8	13.0	13.3	13.5	13.8	14.0	14.3
32 - 34	13.6	13.8	14.0	14.3	14.5	14.8	15.0	15.3	15.5
35 -37	14.8	15.0	15.3	15.5	15.8	16.0	16.3	16.5	16.8
38 - 40	16.0	16.3	16.5	16.7	17.0	17.2	17.5	17.7	18.0
41 - 43	17.2	17.4	17.7	17.9	18.2	18.4	18.7	18.9	19.2
44 - 46	18.3	18.6	18.8	19.1	19.3	19.6	19.8	20.1	20.3
27 - 49	19.5	19.7	20.0	20.2	20.5	20.7	21.0	21.2	21.5
50 - 52	20.6	20.8	21.1	21.3	21.6	21.8	22.1	22.3	22.6
53 - 55	21.7	21.9	22.1	22.4	22.6	22.9	23.1	23.4	23.6
56 - 58	22.7	23.0	23.2	23.4	23.7	23.9	24.2	24.4	24.7
59 - 61	23.7	24.0	24.2	24.5	24.7	25.0	25.2	25.5	25.7
62 - 64	24.7	25.0	25.2	25.5	6.0	26.0	26.7	26.4	26.7
65 - 67	25.7	25.9	26.2	26.4	26.7	26.9	27.2	27.4	27.7
68 - 70	26.6	26.9	27.1	27.4	27.6	27.9	28.1	28.4	28.6
71 - 73	27.5	27.8	28.0	28.3	28.5	28.8	29.0	29.3	29.5
74 - 76	28.4	28.7	28.9	29.2	29.4	29.7	29.9	30.2	30.4
77 - 79	29.3	29.5	29.8	30.0	30.3	30.5	30.8	31.0	31.3
80 - 82	30.1	30.4	30.6	30.9	31.1	31.4	31.6	31.9	32.1
83 - 85	30.9	31.2	31.4	31.7	31.9	32.2	32.4	32.7	32.9
86 - 88	31.7	32.0	32.2	32.5	32.7	32.9	33.2	33.4	33.7
90 - 91	32.5	32.7	33.0	33.2	33.5	33.7	33.9	34.2	34.4
92 - 94	33.2	33.4	33.7	33.9	34.2	34.4	34.7	34.9	35.2
95 - 97	33.9	34.1	34.4	34.6	34.9	35.1	35.4	35.6	35.9
98 - 100	34.6	34.8	35.1	35.3	35.5	35.8	36.0	36.3	36.5
101 - 103	35.3	35.4	35.7	35.9	36.2	36.4	36.7	36.9	37.2
104 - 106	35.8	36.1	36.3	36.6	36.8	37.1	37.3	37.5	37.8
107 - 109	36.4	36.7	36.9	37.1	37.4	37.6	37.9	38.1	38.4
110 - 112	37.0	37.2	37.5	37.7	38.0	38.2	38.5	38.7	38.9
113 - 115	37.5	37.8	38.0	38.2	38.5	38.7	39.0	39.2	39.5
116 - 118	38.0	38.3	38.5	38.8	39.0	39.3	39.5	39.7	40.0
119 - 121	38.5	38.7	39.0	39.2	39.5	39.7	40.0	40.2	40.5
122 - 124	39.0	39.2	39.4	39.7	39.9	40.2	40.4	40.7	40.9
125 - 127	39.4	39.6	39.9	40.1	40.4	40.6	40.9	41.1	41.4
128 - 130	39.8	40.0	40.3	40.5	40.8	41.0	41.3	41.5	41.8

Jackson, A.S. & Pollock, M.L. (1985). Practical assessment of body composition. Physician & Sports Medicine, 13, 76-90.

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:

3. The recommended healthy body fat ranges are _____ for men and _____ for women.

4. The three skinfold measurement sites for men are: _____, _____ and _____. The three skinfold measurement sites for women are: _____, _____ and _____.

5. 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.

3-Minute Step Test: Procedures and Tools

–3-minute step test: Measuring the recovery heart rate.
–12-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 & Reach Test: Measuring the flexibility of lower back and hamstrings.
–Sit & Reach Box or tape measure.
–Sit & 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 1 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" 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 3 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 1 repetition maximum (1RM). Every major muscle group can be tested by attempting a maximal lift. However, it is possible to predict 1-RM from a simple equation, using a submaximal 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 1-min. 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:

   (Weighted Lifted X Number of Repetitions X 0.03) + Weight Lifted

   = 1 RM Equivalent

5. Compare to standards for 1RM protocol by using the following equation:

   1RM Equivalent ÷ Body Weight = Results (compare to charts)

The dynamometer (isometric strength) test can be used to also used to 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

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

5 Components of Fitness

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 and which 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 end 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 deconditioned 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.

90 Degree 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. Standard push-ups or push-ups with knees on the floor (modified push-ups) can be performed by both men and women. 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. Avoiding 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 $\geq$ 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.

5 Components of Fitness

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

Exercise Prescription and Program Design

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 Average Male 180 lbs	Cals/ Min Average Female 130 lbs
Low Impact Aerobic Class	Aerobic	Heart and Total Body Conditioning	8	6
Hi Impact Step Aerobics	Aerobic	Heart and 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 and Total Body Conditioning	12	9
Cycling 16-19 mph	Aerobic	Heart, Glutes, Hamstrings, Quads, Calves, Core	17	12
Racquetball	Anaerobic	Heart and Total Body Conditioning	12	8
Walking 4 mph (15 min/mi)	Aerobic	Heart and Total Body Conditioning	6	5
Running 6 mph (10 min/ mile)	Aerobic	Heart and Total Body Conditioning	14	10
Circuit Training	Aerobic/Anaerobic	Heart and Total Body Conditioning	12	8
Rollerblading	Aerobic	Heart, Glutes, Hamstrings, Quads, Core	10	7
Swimming Laps Vigor-ously	Aerobic	Heart, Arms, Lats, Glutes, Hamstrings, Abs	16	10
Water Skiing	Anaerobic	Total Upper Body and Lower Body Toning, Core	9	6
Water Volleyball	Anaerobic	Total Upper Body and Lower Body Toning, Core	4	3
Beach/Sand Volleyball	Anaerobic	Total Upper Body and Lower Body Toning	12	8
Court/Volleyball	Anaerobic	Total Upper Body and Lower Body Toning	5	4
Tennis	Anaerobic	Heart, Upper Body and Lower Body Toning	10	7
Basketball	Aerobic/Anaerobic	Heart, Upper Body and Lower Body Toning	12	8
Golf/Walking w Clubs	Aerobic/Anaerobic	Heart, Upper Body and Core	8	6
Hiking	Aerobic	Heart and Lower Body	9	6
Snorkeling	Aerobic	Heart and Core	7	5
Scuba Diving	Aerobic	Heart and Core	10	7

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 3-Minute Step Test?
    - What equipment is needed to conduct the 3-Minute Step Test?
    - Explain the procedures of conducting the 3-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

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
    - 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.
    - 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.
    - Supine Position on Bench
      - Keep the lower back in contact with the bench.
      - 4-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.
    - Overhand: Example of Use: Bent-over row
    - Underhand: Example of Use: Bicep curl
    - Alternated: Example of Use: spotter's handoff position to lifter.
  - Width of Grip
    - Wide: The hands are place on the bar as close to the weight plates as possible.
      - Example of Use: Barbell bench press
    - Common: The hands are placed on the bar about shoulder width and equidistant from the weight plates.
      - Example of Use: Barbell bicep curl
    - Narrow: The hands are placed closer together more narrow than the common grip.
      - Example of Use: Barbell tricep extension

Exercise Prescription and Program Design

Weight Training Program

- **Lifting Terms**
  - Load: The amount of weight lifted.
  - Rep (Repetition): The execution of an exercise one time. The lift and lower of a load one time.
  - 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.
  - Remove loose items from lifting area.
  - Place body in good lifting position (knees bent/back flat).
  - Effectively communicate with lifter.
  - Use appropriate grip (closed alternated hand-off grip).
  - See that the bar is properly loaded.
  - Be alert and quick to respond to dangerous situations.
  - Know when and how much assistance is needed.
  - As a last resort, assume all of the weight of the bar.
  - 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.
  - Confirm the number of reps with the spotter/personal trainer before performing the exercise.
  - Indicate when assistance is needed.
  - Always stay with the bar even in need of a spot.
  - With the assistance of the personal trainer, learn limits and select appropriate loads and reps.

Exercise Prescription and Program Design

Weight Training Program

6-Week Basic Weight Training Program/3 Days a Week

This weight training program is designed to be a basic 6-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 Min-
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 "4-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 6-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 90º 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:

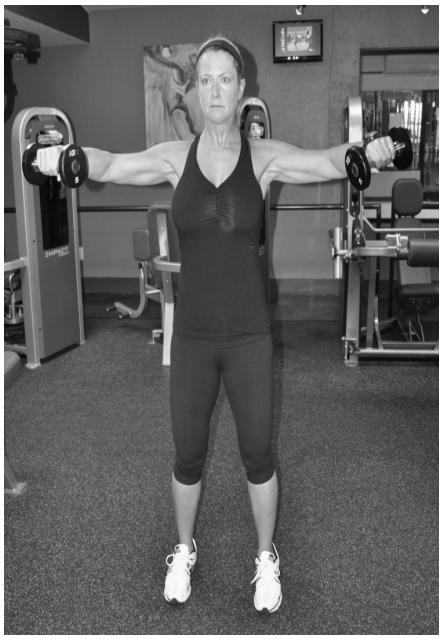
Deltoids

Barbell Shoulder Press
Prime Muscle Movers: Anterior and medial deltoids.
Technique: Perform standing or sitting. Grasp bar slightly wider than shoulder-width with an over-hand 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

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.

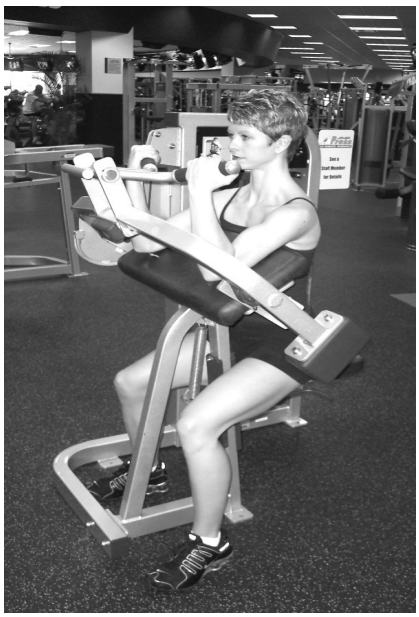


Dumbbell Anterior (Front) Raise
Prime Muscle Movers: Anterior deltoid.
Technique: Perform standing or sitting. Hold dumbbells in each hand with overhand grip. Begin with hands in front of or next to thighs. Inhale to prepare. Exhale while lifting right hand with arm extended to shoulder level. Alternate 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 sides of the head. Exhale while extending elbows and bringing hands to starting position.

Triceps

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.

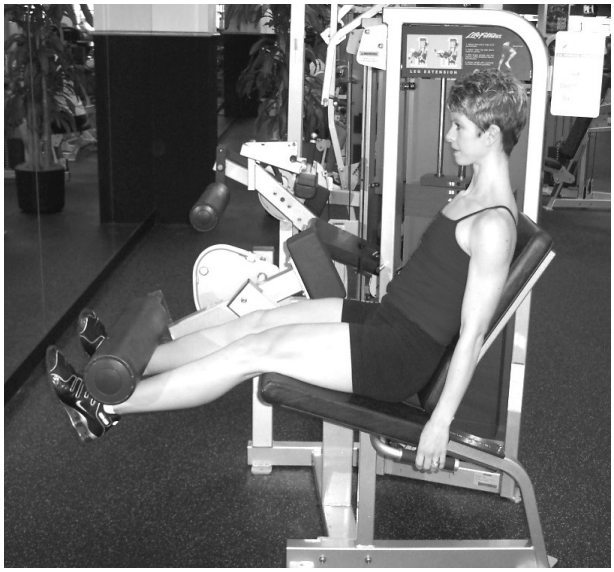
Section #11 Review Questions

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

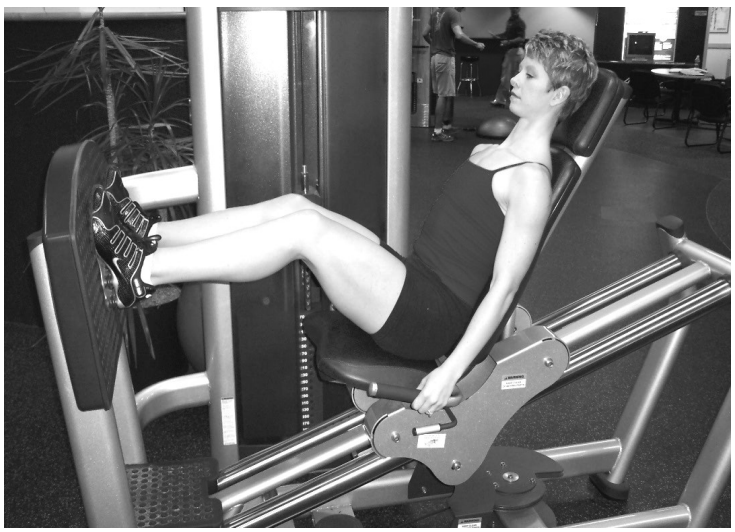
Machine Inner Thigh
Prime Muscle Movers: Adductors.
Technique: Sit on machine with inside of knees resting on machine pads and feet positioned in foot rests. Grasp machine handles to keep torso stable. Inhale to prepare. Exhale while slowly bringing knees together. Slowly return to starting position.

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 90º 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 90º 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:

Exercise Prescription and Program Design

Weight Training Program: Erector Spinae (Lower Back)

Roman Chair Back Extension
Prime Muscle Movers: Lumbar erector spinae (low back) and multifidus.
Technique: Lie facedown on Roman Chair with ankles positioned under foot pads. Position body so that hips flex over the support pad. Pubic pone 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.

Exercise Prescription and Program Design

Weight Training Program: Abdominals

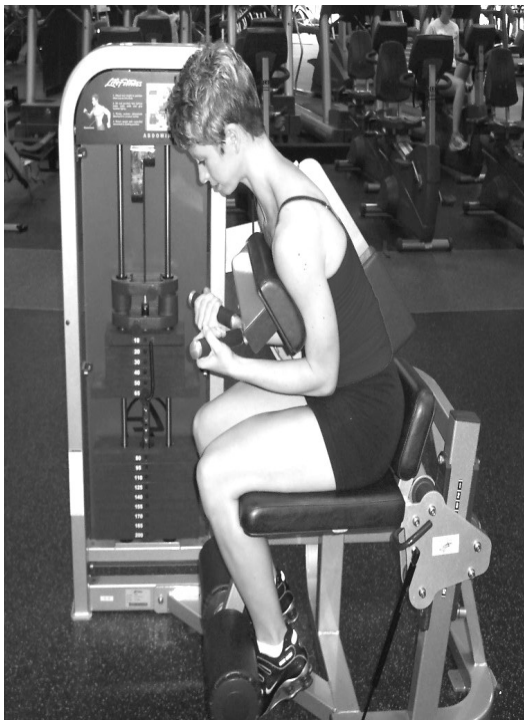
Crunches
Prime Muscle Movers: Rectus abdominis.
Technique: Lie on back with hands behind the head with knees bent and feet resting on a bench. Inhale to prepare. Exhale while bringing head, shoulders and chest off floor by rounding upper spine into a "crunch".

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.

Exercise Prescription and Program Design

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.

Exercise Prescription and Program Design

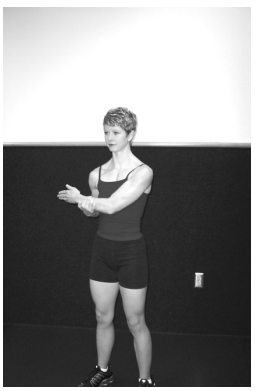
Flexibility Program

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

Upper Body Stretches

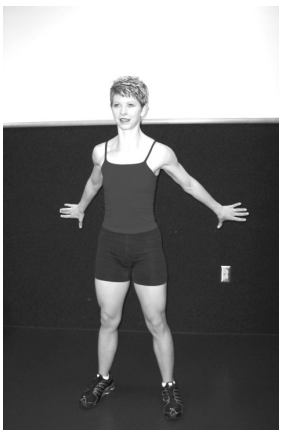
Pectorals
Technique: Extend arms behind back and grasp hands together by entwining fingers. Press the hands downward and hold for 15-30 seconds. Be mindful of keeping hands close to the body to avoid hyperextension of the shoulders.

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.

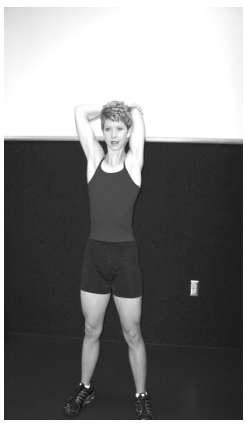


Deltoids
Technique: Grasp forearm with opposite hand and gently pull arm across body toward opposite shoulder. Hold 15-30 seconds. Repeat on opposite side.

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.

Exercise Prescription and Program Design

Flexibility Program

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 leg of the back leg. Hold for 15-30 seconds. Repeat on opposite side.

Exercise Prescription and Program Design

Flexibility Program

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?

Exercise Prescription and Program Design

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 Forms

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

FiTOUR® Fitness Instructor Observation Sheet

Please contact a fitness instructor from a local health club, YMCA, or any other institution so that you may arrange a time that is convenient for both to complete the instructor observation. This observation will allow you to gain perspective as to the methods of teaching and instruction in the particular discipline. Please complete the form below while doing the observation. NOTE: Please be sure to explain to the instructor that this observation will not be used for anything other than to aid in learning and that this observation sheet will not be viewed by anyone.

Instructor Name _____ Class Location/Name _____

PERSONALITY	**PREPARATION**	**TECHNIQUE**	**PARTICPANTS**
Please place a number from 1-5 on the lines below (5 being the highest)	Please place a number from 1-5 on the lines below (5 being the highest)	Please place a number from 1-5 on the lines below (5 being the highest)	Please place a number from 1-5 on the lines below (5 being the highest)
___Maintains Positive Personal Hygiene	___Time was used effectively and efficiently	___ Encourages with Positive Reinforcement	___Participants are Enjoying the Class
___Maintains Poise and Composure	___Use of Appropriate Language	___Provides an Atmosphere Conducive to Learning	___Participants are on Task Throughout the Class
___Maintains professional attitude	___Evidence of Planning/Preparation	___Utilizes "Hands On" Teaching Strategies	___Participants Approach Instructor for "chitchat"
___Develops a Rapport with Participants	___Room Size/Room Temperature was Adequate	___Voice Projection	___Participants are Serious About the Class
___Creates a Fun, Safe, Enjoyable Atmosphere	___Demonstrates Proficient Knowledge in Subject Area	___Proximity-Changes Places Frequently to Observe	___Communicates with Participants
___Total out of 25	___ Total out of 25	___ Total out of 25	___ Total out of 25
___Total out of 100			

Evaluation/Comments:

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

1. BMI: Body Mass Index

- Formula

  Weight in Pounds ÷ Height in Inches^2 X 703 = BMI

- Chart

Height (inches)	BODY MASS INDEX (kg/m2) Body Weight (pounds)													
	19	20	21	22	23	24	25	26	27	28	29	30	35	40
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

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

2. WHR: Waist to Hip Ratio

- Formula

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

- 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 3 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
    - Skinfold Caliper Measurement
    - BMI
    - Waist to Hip Ratio
    - Bioelectrical Impedance
- 3-Minute Step Test (Cardiorespiratory Fitness)
- Sit and Reach Test (Flexibility)
- Muscular Strength: One of the following
    - Leg Press Test
    - Bench Press Test
    - Dynamometer
- Muscular Endurance: One of the following
    - Push Up Test
    - 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 heart beat, 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 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?

2) When you do physical activity, do you feel pain in your chest?

3) When you were not doing physical activity, have you had chest pain in the past month?

4) Do you ever lose consciousness or do you lose your balance because of dizziness?

5) Do you have a joint or bone problem that may be made worse by a change in your physical activity?

6) Is a physician currently prescribing medications for your blood pressure or heart condition?

7) Are you pregnant?

8) Do you have insulin dependent diabetes?

9) Are you 69 years of age or older?

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 by BEFORE you become more physically active. Tell your doctor your intent to exercise and to which questions you answer 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 advise 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:

RETEST DATE:_____

Appendix H

Personal Trainer Checklist

Client: _____

√	Date Completed	Procedure
		Initial Consultation
		Gave out Pre-Fitness Assessment Instructions
		Sent Letter to Physician if Applicable
		Assessment of the 5 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 6-Week Exercise and Weight Management Program
		-Cardio Program
		-Weight Resistance Training Program
		-Flexibility
		-Specialized Weight Management Program
		Train Client for 6 Weeks Making Needed Program Adjustments
		Retest 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												
Errector Spinae												
Abdominals												
Cardio												
Flexibility												
Nutritional Goals												

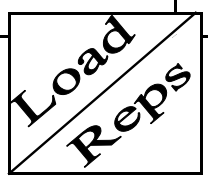
Load / Reps

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

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

After Week 6, adjust weight training workout to a more specialized program.



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.

References and Suggested Reading

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- **NO Continuing Education Credits required!!** Simply complete a 25 question renewal examination in the area which you hold the certification!
- The **FiTOUR®** renewal fee is **ONLY $25** for any **FiTOUR®** Certification! That means that $25 every two years renews your **FiTOUR®** Certification!
- Your certification is valid/current for two (2) years from the date issued on the certificate

Renewal Fees
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About the Renewal Examination
The certification renewal examination consists of 25 questions that are derived from the original certification examination. Please reference your **FiTOUR®** certification study manual in the area of which you hold the certification prior to taking the renewal examination.

If the minimum score (75%) is not achieved on the renewal examination, a retest is available. You may retest as many times as necessary. The fee for each retest is $25.

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1. Login to the Exam Center located at www.FiTOUR.com within 90 days prior to the expiration date. Certifications will not be eligible for renewal until 90 days prior to the expiration date. (you may check the expiration date(s) of your certification(s) by logging into you're the My Account section at www.FiTOUR.com).
2. Pay the $25 renewal fee via our secure online processing system
3. Begin and successfully complete (75% or higher) the 25 question renewal examination in the area of your certification
4. Receive an updated certificate with an expiration date for another two years!
5. Maintain your fitness certification for **ONLY $25** and NO CEC's!!

TURNING EDUCATION UPSIDE DOWN!

Since you now have received the study materials for an additional FiTOUR® Certification Course FREE compliments of FiTOUR®, you may register for this additional course examination for ONLY $65! Visit www.FiTOUR.com/SAVE to register while the promotional price is still available.

Simply close your book,
Flip it OVER and Turn it UPSIDE DOWN.
Two Books in One!

You are a dedicated Fitness Professional and have chosen to become more qualified in the area of Health and Wellness, FiTOUR® has decided to provide an added bonus unlike any other educational organization in the fitness industry.

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Advance Functional and Fitness Performance Assessment Record

TEST	SCORE	RETEST SCORE
Functional Strength Tests		
Total Leg Strength Test		
Hamstring/Quadriceps Strength Test		
Bench Press		
Functional Flexibility Tests		
Sock Test		
Fingertip-to-Floor Test		
Muscle Coordination - Ball Toss Test		
Muscle Balance/Imbalances Tests		
Dynamic Measurement		
Static Measurement: The Stork Test		
Postural Inspection		
Postural Alignment - Quick Assess-ment		
Agility - The Illinois Agility Test		
Speed - 30m Sprint Test		
Power - Standing Long Jump Test		
Reaction Time - Dropped Ruler Test		
Skill Assessment		

***NOTE: Retest every 3 months.**

BEHAVIORAL CHANGE CONTRACT

I _____(client) do agree that I will adhere to the suggested exercise and diet guidelines as set forth by _____ (trainer):

1. I will attend all scheduled Personal Training Sessions at _____am/pm on _____(day(s)) for _____ weeks beginning on _____, 20___ and ending on _____, 20___.

2. I will keep a daily journal in which I record daily exercise activities.

3. I will keep a daily journal in which I record food and calorie consumption.

4. I commit to having positive thoughts and engaging in positive behavior.

5. I commit to letting go of habit patterns that are unhealthy and negative and that have kept me from successfully reaching my goals in the past.

6. I commit to forming new habit patterns that are healthy and positive to replace the old habit patterns in a constant effort to improve the areas of my life that I identified as needing improvement.

7. I commit to advising the _____ (trainer) of any injury or illness I experience.

8. I commit to asking for modified exercises if the execution an exercise being performed during any training sessions results in pain or feels as if it could cause injury.

9. I commit to taking each day one at a time and to making positive changes every day.

10. At the conclusion of the time period listed above, I commit to adopting and maintaining all of the positive changes and new habit patterns formed during the training program.

Signed _____ Date _____

PLAN OF CHANGE
IDENTIFY HABIT PATTERNS THAT CREATE ROADBLOCKS

1. Food Choices

2. Exercise Choices

3. Unhealthy or Negative Thoughts

4. Unhealthy or Negative Behavior (smoking, alcohol, drug abuse, caffeine, diet sodas, etc.)

5. Daily Activities/Habits: Briefly examine the activities of a typical day. List each activity and the time you generally participate in that activity.

AM:

Mid-AM:

Noon:

Mid-Afternoon:

Early PM:

Late PM:

GOAL SETTING QUESITONNAIRE

DEGREE of SATISFACTION with Current Level of Fitness *Check the best number for each aspect of your current fitness level, using this scale:* *4 = Very Satisfied 3 = Satisfied 2 = Dissatisfied 1 = Very Dissatisfied*	**4**	**3**	**2**	**1**
Amount of Energy				
Cardiovascular Endurance				
Muscular Strength & Endurance				
Flexibility of Hamstrings and Low Back				
Ability to cope with tension & stress				
Ability to relax				
Ability to get a good night's rest				
Low-back function				
Physical appearance/Body Weight				

AREAS OF IMPROVEMENT
Take a few moments to think about the areas of your life which you feel need improvement. Briefly list areas of improvement below.

1. Specific Physical Problem:

2. Appearance of Particular Part of Body:

3. Ability to Participate in a Specific Sports (i.e. tennis, skiing, running, etc.)

4. Risk of a Health Problem:

5. Other:

Appendix
Forms

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

FiTOUR® Fitness Instructor Observation Sheet

Please contact a fitness instructor from a local health club, YMCA, or any other institution so that you may arrange a time that is convenient for both to complete the instructor observation. This observation will allow you to gain perspective as to the methods of teaching and instruction in the particular discipline. Please complete the form below while doing the observation. NOTE: Please be sure to explain to the instructor that this observation will not be used for anything other than to aid in learning and that this observation sheet will not be viewed by anyone.

Instructor Name _____ Class Location/Name _____

PERSONALITY	**PREPARATION**	**TECHNIQUE**	**PARTICPANTS**
Please place a number from 1-5 on the lines below (5 being the highest)	Please place a number from 1-5 on the lines below (5 being the highest)	Please place a number from 1-5 on the lines below (5 being the highest)	Please place a number from 1-5 on the lines below (5 being the highest)
___Maintains Positive Personal Hygiene	___Time was used effectively and efficiently	___ Encourages with Positive Reinforcement	___Participants are Enjoying the Class
___Maintains Poise and Composure	___Use of Appropriate Language	___Provides an Atmosphere Conducive to Learning	___Participants are on Task Throughout the Class
___Maintains professional attitude	___Evidence of Planning/Preparation	___Utilizes "Hands On" Teaching Strategies	___Participants Approach Instructor for "chitchat"
___Develops a Rapport with Participants	___Room Size/Room Temperature was Adequate	___Voice Projection	___Participants are Serious About the Class
___Creates a Fun, Safe, Enjoyable Atmosphere	___Demonstrates Proficient Knowledge in Subject Area	___Proximity-Changes Places Frequently to Observe	___Communicates with Participants
___Total out of 25	___ Total out of 25	___ Total out of 25	___ Total out of 25
___Total out of 100			

Evaluation/Comments:

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 acronym **RICEM**:

2. List three common causes of injuries which can occur while performing fitness activities:

3. List five common chronic sports or conditioning injuries that can be caused through overuse or misuse of the muscles and connective tissues; include methods of prevention of each injury listed:

4. Briefly explain the difference between a chronic injury and an acute injury:

5. List the five common acute sports injuries and steps that should be taken if an individual suffers such injury:

Common Sport and Conditioning Injuries

4. Stress Fractures
   Prevention: Do complete warm-ups and cool-downs that benefit all areas of the body. Do not exercise or put too much stress on one part of the body.
5. Tennis Elbow
   Prevention: Build forearm strength by doing reverse curls with light weights or by squeezing a rubber ball.
6. Shoulder Pain
   Prevention: Roll the shoulders forward and then backwards to release tension.
7. Plantar Fasciitis: Plantar fasciitis is the most common cause of pain on the bottom of the heel. Usually indicated by pain in the first steps of the morning. Pain also occurs with the onset of activity such as walking and running, which subsides as activity progresses, and usually returns after resting and then resuming activity. Plantar Fasciitis is an inflammatory response and is common in runners performing repetitive plantar flexion and dorsiflexion of the toes. It is also common with sudden weight gain.
   Prevention: Wear supportive shoes. Massage the bottom of the foot by rolling it over a bottle.
8. Tendinitis - Inflammation (redness, soreness, and swelling) of a tendon.
9. Impingement Syndrome - The trapping of an inflamed tendon under a joint.
10. Bursitis - An inflamed bursa sac that is supposed to protect the joint.
    Prevention of Tendinitis, Impingement Syndrome, and Bursitis: Avoid performing the same exercises without rest in between sessions.

Common Acute Injuries: Acute injuries are ones that occur immediately during an activity and should be treated with RICEM. The client should be referred to his/her doctor immediately.

1. Strain - An injury to a tendon (the tissue that connects bone to muscle).
2. Sprain - An injury to a ligament (the tissue that connects bone to bone).
3. ACL Injury - Injury to the cruciate ligaments of the knee is sometimes referred to as a "sprain." The anterior cruciate ligament is most often stretched, torn, or both by a sudden twisting motion (for example, when the feet are planted one way and the knees are turned another way). The posterior cruciate ligament is most often injured by a direct impact, such as in an automobile accident or football tackle.
4. Abrasions (“Road Rash”) - Abrasions are very common sport injuries that are usually caused by a fall on a hard surface. As the athlete falls or slides on the ground friction causes layers of skin to rub off. The skin is composed of an outer layer (the epidermis) which provides protection, and a deep inner layer (the dermis) which provides the firmness and flexibility of the skin. Abrasions typically refer to an injury that removes these layers of skin.
5. Muscle Cramps - A cramp is an involuntary and forcibly contracted muscle that does not relax. Cramps can affect any muscle under your voluntary control (skeletal muscle). Muscles that span two joints are most prone to cramping.

Common Sport and Conditioning Injuries

The inevitable injury, whether it be acute or chronic, is an issue that a personal trainer may experience with a client. Although a personal trainer should never diagnose an injury, he/she can be aware of the common injuries. If a client complains of pain and does not subside in 10 days, the personal trainer should advise his/her client to see the client's doctor. The personal trainer can apply the RICEM concept to an acute injury.

Rest the injured body part or entire body
Ice the injured body part
Compress the injured body part to reduce swelling if applicable
Elevate injured body part above heart
Modality of exercise should be altered to give the injured area enough time to heal

Common Causes of Injuries:

1. Intrinsic Causes
   - Lack of Strength
   - Poor Flexibility
   - Posture Defects
   - Weak Joints
   - Improper Hydration
   - Muscle Imbalance
   - Excess Body Weight
   - Poor Endurance
   - Poor Warm-Up

2. Extrinsic Causes
   - Uneven Surface
   - Faulty Equipment
   - Improper Footwear
   - Sudden Trauma
   - Bad Weather

Common Chronic Injuries: Most sport or conditioning injuries are due to overuse or misuse of the muscles and connective tissues. Below are common injuries and tips on how to prevent them.

1. Muscle Pull
   Prevention: Warm-up before a workout and stretch after the workout. Do not bounce while stretching.
2. Runner's Knee
   Prevention: Strengthen the muscles, tendons, and ligaments surrounding the knee by performing leg extensions.
3. Shin Splints
   Prevention: Well-cushioned shoes with arch supports can help prevent excessive jarring of muscles. If possible, athletes should exercise on soft surfaces like wood or grass and avoid working out on hard surfaces like pavement or concrete. Athletes should warm up slowly and stretch after participating in rigorous activity.

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. Briefly explain how to modify the pass the ball exercise to be less challenging for individuals who may experience tight hamstrings:

2. Briefly explain how to perform conventional crunches on an exercise ball:

3. Briefly explain how to perform a back extension on an exercise ball:

4. Briefly explain how to perform oblique crunches on an exercise ball and provide a modification for individuals who may experience problems balancing while performing the exercise:

5. Briefly explain how to perform plank using an exercise ball:

6. Briefly explain how to perform push-ups using an exercise ball:

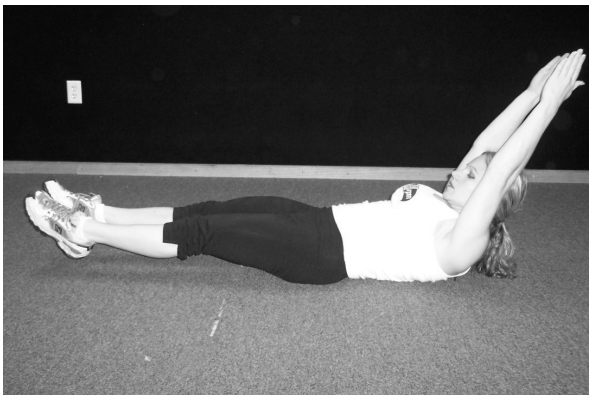
Core Strengthening Exercises

Pilates Teaser

Equipment Needed: None

Procedures: Position the client in a supine position with the legs and arms fully extended off the floor. In one smooth movement, lift the legs and torso to a
V-seated position. With the arms extended, hold the “V” position then lower the body back to the starting position. Rest for 30-60 seconds between sets.

Sets: 3 sets of 5 reps.



Core Strengthening Exercises

Pilates Single Leg Stretch (Exercise Ball)

Equipment Needed: 1 Exercise Ball (optional)

Procedures: Position the client in a supine position with one knee towards the chest and the other leg fully extended off the floor. The arms are fully extended above the chest holding the ball. Alternate the knees towards the chest while holding up the ball. Pull the navel to the spine to engage the abs. Rest for 30-60 seconds between sets.

Sets: 3 sets of 5-10 reps.

Core Strengthening Exercises

Push Ups (Exercise Ball)

Equipment Needed: 1 Exercise Ball (optional)

Procedures: Position the client in a plank position with the arms fully extended on the exercise ball. The feet are on the floor with the balls of the feet in contact with the floor and the heels elevated. Lower the chest down towards the ball by flexing the elbows. Push back up to starting position. Rest for 30-60 seconds between sets.

Sets: 3 sets of 5-10 reps.

Core Strengthening Exercises

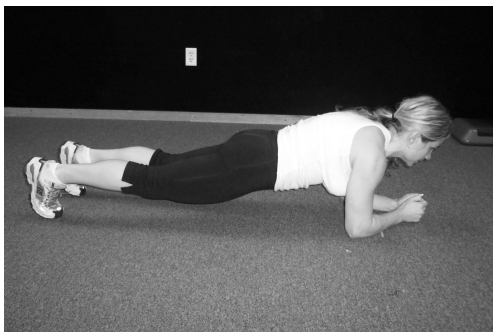
Plank (With or Without the Exercise Ball)

Equipment Needed: 1 Exercise Ball (optional)

Procedures: Position the client in a plank position with the arms fully extended on the exercise ball. The feet are on the floor with the balls of the feet in contact with the floor and the heels elevated. Hold this position for 30 seconds. Rest for 30-60 seconds between sets.

Sets: 3 sets of 12-15 reps.

Modification #1: Perform the plank without the ball.
Modification #2: Perform the plank on the forearms.



Core Strengthening Exercises

Oblique Crunches (Exercise Ball)

Equipment Needed: 1 Exercise Ball

Procedures: Position the client in a side-lying position on the exercise ball. The legs are extended to the side with one foot in front of the ball for stability. One hand is behind the head while the other hand is comfortably placed in front of the chest. Laterally flex the spine to one side and lower back down to starting position. Rest for 30-60 seconds between sets. After 3 sets on one side, switch to the other side.

Sets: 3 sets of 12-15 reps.

Note: To modify, place one knee on the floor.

Core Strengthening Exercises

Reverse Crunches (Exercise Ball)

Equipment Needed: 1 Exercise Ball

Procedures: Position the client supine on the floor with the back flat against the floor. The knees are bent with the exercise ball placed under the knees. The feet are hooked over the ball to secure the position of the legs. Keep the knees at 90°. Lift the hips off the floor bringing the knees towards the chest. Use the abdominals to lift the hips. Rest for 30-60 seconds between sets.

Sets: 3 sets of 12-15 reps.

Core Strengthening Exercises

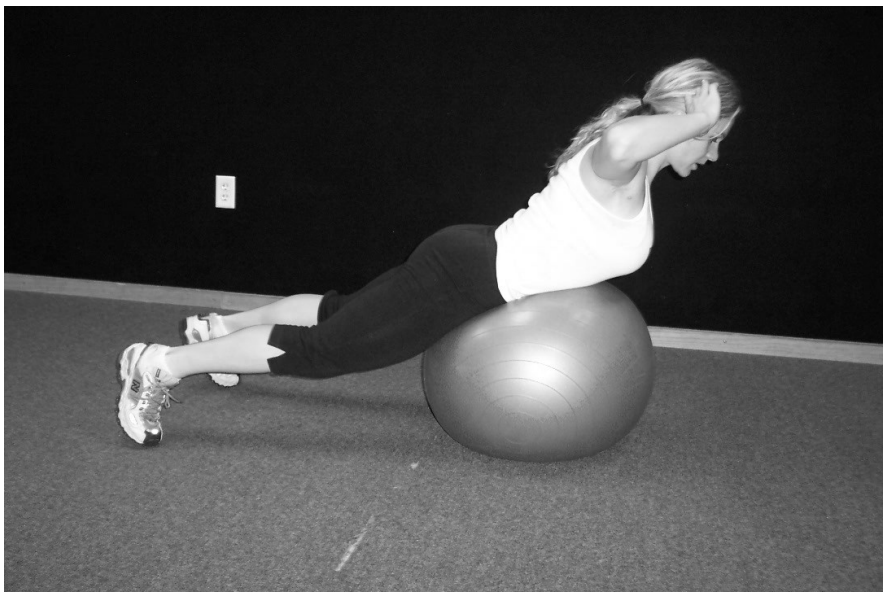
Back Extension (Exercise Ball)

Equipment Needed: 1 Exercise Ball

Procedures: Position the client prone on the exercise ball with the hips in contact with the ball and the toes in contact with the floor about hip width apart. The hands are placed lightly behind the head. The client lifts the torso extending the spine, contracting the abdominals, and squeezing the glutes. Rest for 30-60 seconds between sets.

Sets: 3 sets of 12-15 reps.

Note: To make this exercise more challenging, extend the arms overhead.



Core Strengthening Exercises

Conventional Crunches (Exercise Ball)

Equipment Needed: 1 Exercise Ball

Procedures: Position the client supine on the exercise ball with the small of the back in contact with the ball and the feet flat on the floor about hip width apart. The client lifts the torso flexing the spine and contracting the abdominals. Rest for 30-60 seconds between sets.

Sets: 3 sets of 12-15 reps

Note: To make this exercise more challenging add a weight plate or throw a medicine ball between the trainer and client.

Core Strengthening Exercises

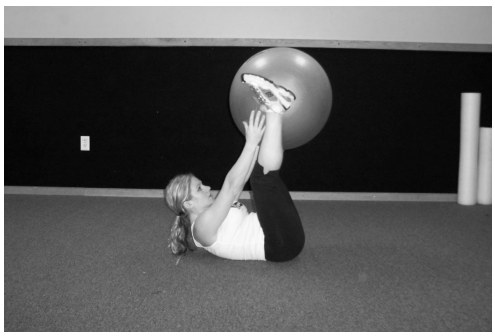
Pass the Ball (Exercise Ball)

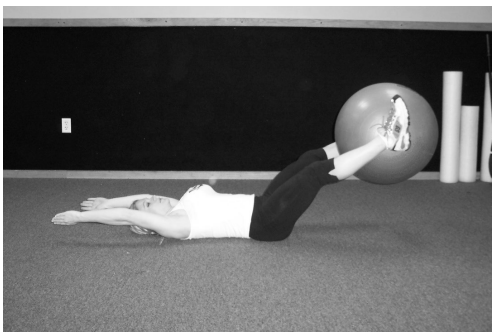
Equipment Needed: 1 Exercise Ball

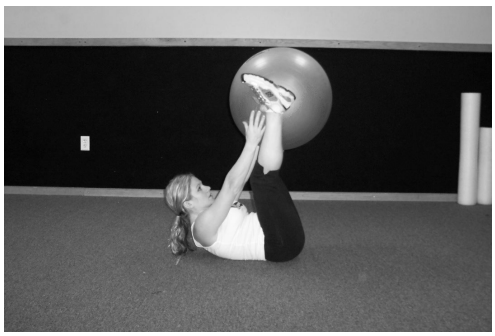
Procedures: In a supine lying down position, the client passes the exercise ball from the hands to the feet. Then, the client extends the legs out and down and the arms overhead. Then, the client lifts the legs and arms and passes the ball to the hands. The legs lower and the arms extend back overhead holding the ball. Rest for 30-60 seconds between sets.

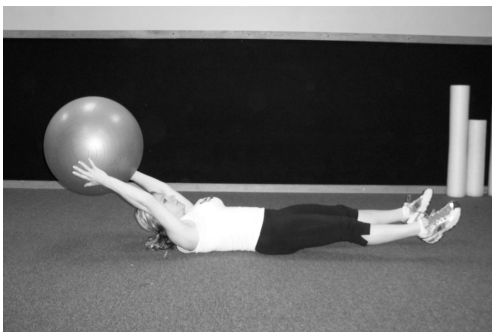
Sets: 3 sets of 12-15 reps.

Note: The straighter the legs and arms, the more challenging this exercise becomes.









Core Conditioning

Core Strengthening Exercises

1. Pass the ball with exercise ball.
2. Conventional crunches on exercise ball.
3. Back extensions on exercise ball.
4. Reverse crunches with exercise ball.
5. Oblique crunches on exercise ball.
6. Plank on forearms, fully extended arms and on exercise ball.
7. Push-Ups on exercise ball.
8. Pilates Single Leg Stretch with exercise ball.
9. Pilates Teaser

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. Briefly explain how to perform upper body exercises using balancing disks:

2. Briefly explain how to perform squats using a balancing dome:

3. Briefly list and explain the guidelines for perform balance and coordination exercises:

4. List the recommended equipment for the following body segments and name an exercise that will develop balance and coordination for each particular body segment:

    - Upper Body:

    - Abductors:

    - Thighs and Glutes:

    - Back Extensors and Hamstrings:

Balance and Coordination Exercises

Bridge (Exercise Ball)

Equipment Needed: 1 Exercise Ball

Procedures: The client lies on the floor with the feet placed on the ball about hip width apart. The back is completely flat on the floor. Starting at the tailbone the client articulates the spine one vertebra at a time lifting the hips towards the sky. The client pushes the feet into the ball continuing to lift the hips upward. Then the client lowers the back and hips down imprinting the spine into the floor one vertebra at a time.

Sets: 3 sets of 12-15 reps

Balance and Coordination Exercises

Abductor Lifts (Balancing Dome)

Equipment Needed: 1 Balancing Dome (Hand weights are optional)

Procedures: Place one foot on the dome and the other foot on the floor about hip width apart and knees bent in a squat position. Lift the foot that is on the floor abducting the leg to hip level or as high as possible. Lower the leg down and execute again. Perform 12-15 reps then switch to the other side.

Sets: 3 sets of 12-15 reps on each leg.

Note: Hand weights are optional. Place the weights either on the shoulders or on the hips.

Balance and Coordination Exercises

Lunges (Balancing Dome)

Equipment Needed: 1 Balancing Dome (Resistance tubing is optional)

Procedures: Place one foot on the dome with the other leg extended backwards on the floor. Place the back ball of the foot on the floor with the heel raised. Bend both knees to 90° as you lunge straight down. Push back up to starting position. Perform 12-15 reps then switch to the other side.

Sets: 3 sets of 12-15 reps on each leg.

Note: Resistance tubing is optional. Place the tubing underneath the dome.

Balance and Coordination Exercises

Squats (Balancing Dome)

Equipment Needed: 1 Balancing Dome (Resistance tubing is optional)

Procedures: Stand on the balancing dome with the feet hip width apart and knees slightly bent. Squat down as far as possible bringing the thighs no further than parallel to the floor. Pushing upwards, extend the legs straight back to the beginning position.

Sets: 3 sets of 12-15 reps

Note: Resistance tubing, medicine ball or hand weights are optional. When using resistance tubing, place the tubing underneath the dome.

Balance and Coordination Exercises

Upper Body (Balancing Disks)

Equipment Needed: 2 Balancing Disks

Procedures: Stand on the balancing disks with the right foot on one disk and the left foot on the other. With the weights in each hand perform bicep curls.

Sets: 3 sets of 12-15 reps

Note: You can perform any upper body resistance exercise while balancing on the disks.

Balance and Coordination Development

1. Warm up thoroughly.
2. Balance and Coordination drills can be performed on any day in combination with the regular training days.
3. A typical session should consist of approximately 3 of 12-15 repetitions.
4. Two-three sessions a week is adequate.
5. Always mirror the movement patterns of the specific sport or fitness activity when choosing drills that develop balance and coordination.

Balance and Coordination Exercises

1. Upper body exercises performed standing on balancing disks.
2. Squats performed on balancing dome.
3. Lunges performed on balancing dome.
4. Abductor lifts performed on balancing dome.
5. Bridge with exercise ball.

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 and be familiar with the safety guidelines when performing plyometric drills:

2. Briefly explain how to perform the Butt Slap exercise:

3. Briefly explain how to perform Box Jumps:

4. How many sets are recommended for the Squat Jump Throw:

5. Briefly explain how to perform Jump Running:

6. Briefly explain how to perform Single Leg Hops:

7. What equipment is needed to perform the Chest Throw?

Power Development
Upper Body Plyometrics: Pullover Throw (Medicine Ball)

Equipment Needed: Medicine Ball

Procedures: The personal trainer and the client are place about 10 feet apart. The client lies on the floor with the knees bent and the feet on the floor. The arms are fully extended holding the medicine ball overhead (maybe even touching the floor if possible). With straight arms, the client throws the ball to the personal trainer and the trainer throws the ball back. Perform this exercise for 1 minute and rest for 30-60 seconds before the next set.

Sets: 5

Note: The client can use an exercise ball to improve balance at the same time.

Power Development
Upper Body Plyometrics: Overhead Throw (Medicine Ball)

Equipment Needed: Medicine Ball

Procedures: The personal trainer and the client stand about 10 feet apart. The feet are about shoulder width apart with the knees slightly bent. Using both hands with the ball held over and behind the head, the personal trainer and client throw the ball back and forth with an explosive pushing action. The arms are always extended when throwing the ball. Avoid arching the back. Perform this exercise for 1 minute and rest for 30-60 seconds before the next set.

Sets: 5

Power Development
Upper Body Plyometrics: Chest Throw (Medicine Ball)

Equipment Needed: Medicine Ball

Procedures: The personal trainer and the client stand about 10 feet apart. The feet are about shoulder width apart with the knees slightly bent. Using both hands with the ball held at chest height, the personal trainer and client throw the ball back and forth with an explosive pushing action. Perform this exercise for 1 minute and rest for 30-60 seconds before the next set.

Sets: 5

Power Development
Lower Body Plyometrics: Tuck Jumps

Equipment Needed: None

Procedures: Stand with legs shoulder width apart with knees slightly bent. Jump up and bring the knees towards the chest. As you land, immediately jump up again, minimizing the amount of time on the ground. Perform the jumps for 30 seconds and rest for a minute before the next set.

Sets: 5

Power Development
Lower Body Plyometrics: Single Leg Hops

Equipment Needed: None

Procedures: Stand on one leg with the knee bent slightly. Remain standing on the same foot. Jump up as high as possible. Try to minimize the time spent on the ground. Perform the single hops on one side for 30 seconds and then switch to the other leg.

Sets: 5

Power Development
Lower Body Plyometrics: Jump Running

Equipment Needed: None

Procedures: Run in slow motion landing on alternate feet. Try to achieve as much height and distance with each stride as possible. Perform for 1 minute and rest for 30-60 seconds before the next set.

Sets: 5

Power Development
Lower Body Plyometrics: Squat Jump Throw

Equipment Needed: 3 Pound Medicine Ball

Procedure: Stand with feet hip width apart with knees bent. Squat down to where the thighs are parallel to the floor. Jump vertically and drive arms holding the medicine ball straight up to the sky. Do not release the ball. As you land, immediately squat down and repeat. Minimize the time spent on the ground. Focus on strong explosive and powerful movement. Do as many jumps as you can and rest for 1 minute before the next set.

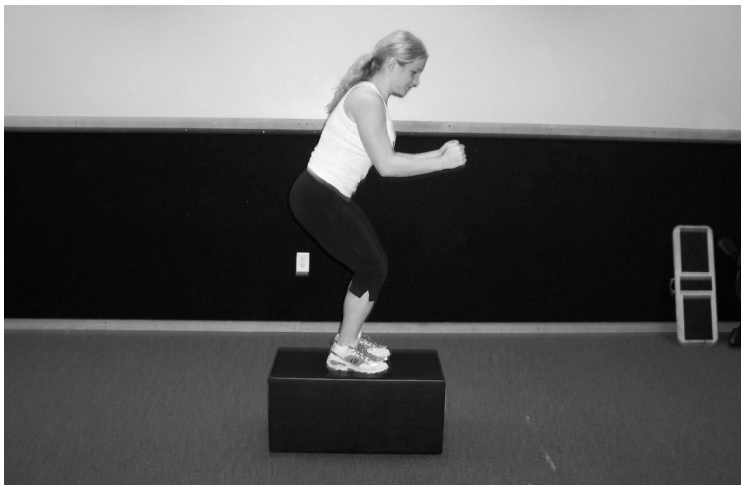
Sets: 5

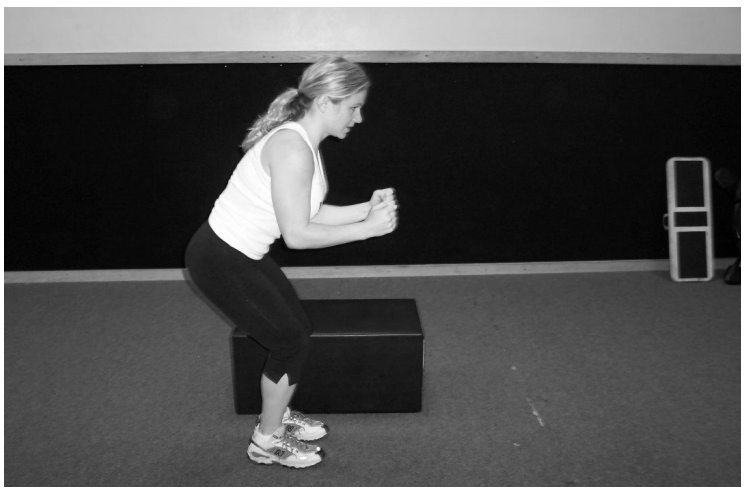
Power Development
Lower Body Plyometrics: Box Jumps

Equipment Needed: 18-24 Inch Box
**Tip: Take client ability, skill, age, orthopedic issues into consideration when performing. A lower box or step may be used if appropriate.*

Procedure: Stand on top of the box with feet about hip width apart. Jump down to the side of the box with knees bent and immediately drive knees up to the chest and jump back up to the box. Perform this drill for 30 seconds to 1 minute with 30 second rest between sets.

Sets: 5





Power Development
Lower Body Plyometrics: Butt Slaps

Equipment Needed: None

Procedure: Run forward by raising the back foot as high as possible kicking the buttocks without raising the knee. The progress forward should be equal to the speed of walking. Perform this drill for 1 minute with 30 second rest between sets.

Sets: 5

Power Development

Plyometrics: Exercises that are the rapid deceleration and acceleration of muscles that create a stretch-shortening cycle. The exercises train the muscles, connective tissue and nervous system to effectively carry out the stretch-shortening cycle, thereby improving a client's performance. Plyometric drills help develop rhythm, speed, power and even muscular endurance.

Plyometric Safety Guidelines:
1. Warm up thoroughly.
2. Plyometric drills should be performed on separate days from other training days.
3. One must have a strong fitness base before trying these plyometric drills.
4. A typical session should consist of approximately 5 sets of 10 repetitions.
5. One-two sessions a week.
6. Always mirror the movement patterns of the specific sport or fitness activity when choosing drills that develop power.

Lower Body Plyometrics
1. Butt slaps.
2. Box jumps.
3. Squat jump throw with medicine ball.
4. Jump running.
5. Single leg hops.
6. Tuck jumps.

Upper Body Plyometrics
1. Chest throw with medicine ball.
2. Overhead throw with medicine ball.
3. Pullover throw with medicine ball.

Specialized Conditioning Programming

The FiTOUR Advanced Personal Training Certification focuses on advanced assessments, including agility, speed, power, balance, and coordination. The following exercises focus on developing these fitness performance components.

Agility and Speed Development: The following exercises develop agility and speed. Quality is the key to speed and agility drills being successful. Keep the individual sprints short and rest completely between sets.

General Guidelines for Agility and Speed Drills

1. Warm up thoroughly.
2. Speed and agility drills should be performed on separate days from other training days.
3. One must have a strong fitness base before trying these agility and speed drills.
4. A typical session should consist of approximately 5 sets of 10 repetitions (each sprint being 1 repetition).
5. One-two sessions a week.
6. Always mirror the movement patterns of the specific sport or fitness activity when choosing drills that develop agility and speed.

Agility and Speed Exercises

1. Conventional Suicide Drill

Equipment Needed: 5 Cones

Procedures: Set up the cones 10 meters apart in a single line. On command from the personal trainer, the client sprints to the first cone, then sprints back to the starting line. Then the client sprints to cone #2, then back to the starting line. Then the client sprints to cone #3, then back to the starting line. He/she repeats the same pattern until he/she gets to the 5th cone and back to the starting line. The client repeats this drill 4 more times.

2. Up Hill Sprint

Equipment Needed: 2 Cones

Procedures: Place the two cones 10-15 meters apart on a hill that is at least 30 degrees at an angle. On command from the personal trainer, the client sprints as fast as he/she can from one cone to the other uphill. The client walks back to the first cone to repeat immediately (this is 1 rep). The client should do 5 sets of 10 taking a longer break in between sets.

3. Hollow Sprints

Equipment Needed: 6 Cones

Procedures: Place the Cones 30 meters apart. Start by sprinting to cone #2, then walk to cone #3, then sprint to cone #4, then walk to cone #5, then sprint to cone #6, then walk back to cone #1 to repeat. Repeat this drill to total 5 sets.

4. Ladder Drills: The personal trainer can set up various agility drills with a ladder.

5. The Weave:

Equipment Needed: 6 Cones

Procedures: Set up the cones 10 meters apart. Sprint to the last cone while weaving in and out of the cones and turn around and weave back to the start. Repeat this drill for a total of 5 sets.

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. List and briefly explain the three weight training goals:

2. Explain how to perform a super set:

3. Explain how to perform a pyramid set:

4. Briefly explain the design of a 4-days a week split program:

5. Explain the causes, signs and prevention strategies of overtraining syndrome:

6. List the activities of kinesiology that can be developed through weight training and Specialized conditioning.

Advance Weight Training Concepts

Activities of Kinesiology: The below activities can be developed through Advance Weight Training and Specialized Conditioning.

1. Category #1 - Continued application of a force.

   Pushing - Extension action that can be trained through advance weight lifting.
   Pulling - Flexion action that can be trained through advance weight lifting.
   Lifting - An action that can be trained through advance weight lifting.

2. Category #2 - The development of kinetic energy followed by the release of an object at the moment of maximum desired velocity.

   Throwing Motions - An example of Category #2 would be throwing a medicine discussed in the specialized conditioning section.

3. Category #3 - The momentary contact made with an object by a moving part or segment of the body or an implement attached to the body.

   Kicking action
   Striking action

Advance Weight Training Concepts

Overtraining Syndrome: Sometimes a client will become over ambitious in his/her training and become overtrained which can lead to a plateau and eventually burn-out.

Defined: A condition in which there is a plateau or drop in performance over a period of time. The body does not have adequate time to recuperate between training days.

Causes:

1. Not enough rest in between workouts.
2. Working out aggressively and beyond ability.
3. Working out too frequently during the week.

Warning Signs:

1. Irritability.
2. Lack of appetite.
3. Extreme muscle soreness the day after a training session.
4. Decrease in body weight.
5. Inability to complete a training session that should otherwise be completed even though it may be challenging.

Prevention Strategies:

1. Increase training intensity gradually and systematically.
2. Plan days of rest within the overall workout program.
3. Alternate heavy activity/lifting days with light activity/lifting days; heavy activity/lifting weeks with light activity/lifting weeks.
4. Get adequate sleep.
5. Eat properly.
6. Change up the routine to avoid stagnation.

Plateau: The point at which the body adapts to the overload of the workout and no longer elicits a response.

Quick Tips to Overcome Plateau:

1. Eat small meals more often during the day.
2. Take an active rest.
3. Change up the workout routine. Do different types of activity.
4. Vary the intensity levels throughout the week.
5. Get plenty of sleep during the night to have full energy when working out.

Advance Weight Training Concepts

Varying the Intensity of the Training: Once the body has adapted to the variables of an advanced weigh training program, the personal trainer should increase the intensity of the workout to elicit additional responses and a positive training effect.

Periodization
Defined: A method that systematically manipulates volume, intensity, and load in resistance training over a period of time to elicit a specific physiologic response. Periodization allows easy adaptation to the new technique while providing proper physiologic stimuli to key muscle group.

Another term for peridoization is *cycling.* To avoid plateau and/or overtraining, one can schedule cycles of high-intensity with low-intensity workouts over weeks at a time.

7-Week Training Cycle Example: The below chart is an example of periodization. The cycling program varies the training load within the week. At the end of the 3rd and 6th week the client tests the 1RM to increase the load and sets. The 7th week is a light training week to prepare the body for the next and more challenging 7-Week training cycle. The 1st week and 4th week of the training cycle are the weeks that the load has increased. Within the chart below, the *H* stands for heavy load (80% of 1RM) , *MH* stands for medium-heavy load (75% of 1RM), and *L* stands for light load (70% of 1RM).

Testing for New Loads Using 1RM: At the end of the 3rd and 6th week the client will test for a new load. Below are two equations from which to choose.

Brzycki Equation: Weight ÷ (1.0278 - (0.0278 X number of repetitions)) = 1RM
Alternate Equation: Weight X (1 + (0.033 X number of repetitions)) = 1RM

Week	Sets	Monday	Wednesday	Friday
1	3	H	L	MH
2	3	H	L	MH
3	3	MH	L	Test
4	4	H	L	MH
5	4	H	L	MH
6	4	MH	L	Test
7	2	L	L	L
8-14	Repeat 7-Week Training Cycle with heavier loads.			

Arranging Exercises Within a Training Session

- **Muscle Balance:** Pair up exercises that work opposing muscle groups to create balance within a workout.

Agonist Muscle Group	Antagonist Muscle Group
Pectoralis Major/Chest	Rhomboids/Upper Back
Biceps	Triceps
Deltoids	Lats
Gastrocnemius	Tibialis Anterior
Quadriceps	Hamstrings
Abdominals	Erector Spinae

- **Exercise Large Muscle Groups First:** Within many exercises, the smaller muscles are used to assist in working the larger muscles. Therefore, one should avoid fatiguing the smaller muscles before working the larger muscles in order to work maximally. Perform all triceps and bicep exercises after performing pushing and pulling exercises respectively (see below alternating pushing and pulling actions).

- **Alternate Pushing and Pulling Actions:** Alternate exercises that extend and exercises that flex. Exercises that require joint extension is a pushing action. Exercises that require joint flexion is a pulling action. By alternating pushing and pulling actions, the muscles will have ample time to recover between exercises.

Muscle Group	Large/Small Muscle	Push/Pull Action
Pectoralis Major (Bench Press)	Large	Push (Technically Abduction)
Rhomboids	Large	Pull (Technically Adduction)
Biceps	Small	Pull (Flexion)
Triceps	Small	Push (Extension)
Deltoids (Shoulder Press)	Large	Push (Technically Abduction)
Lats	Large	Pull (Technically Adduction)
Gastrocnemius	Small	Push (Extension)
Tibialis Anterior	Small	Pull (Flexion)
Quadriceps	Large	Push (Extension)
Hamstrings	Large	Pull (Flexion)
Gluteus Maximus	Large	Push (Extension)
Abdominals	Large	Pull (Flexion)
Erector Spinae	Large	Push (Extension)

Specialized Weight Training Programs

Super Set Training

- Defined: Consecutively performing two exercises that train opposing muscle groups without rest between them.
- Goal achieved: Muscular hypertrophy.

Compound Set Training

- Defined: Performing two different exercises that work the same muscle group consecutively, without rest between them. For example: performing one set of machine bench presses and then performing one set dumbbell flys.
- Goal achieved: Muscular hypertrophy.

Pyramid Training

- Defined: A method of multi-set training in which loads get progressively heavier or lighter in between sets of the same exercise. As the load increases, the reps decrease.
- Goal achieved: Muscular strength.

Multiple Sets-Same Load Training

- Defined: Performing an exercise more than one set of the same load. The percentage of 1RM is relative to the rep goal.
    - 80% of 1RM/8 Reps
    - 85% of 1RM/6 Reps
    - 90% of 1RM/4 Reps
    - 95% of 1RM/2 Reps
- Goal achieved: Muscular strength .

Training Frequency

3-Days a Week Program: All exercises working all muscle groups are performed 3-days a week resting for 48 hours in between workout days. Example Routine: Monday, Wednesday, Friday/ Tuesday, Thursday, Saturday/ Sunday, Tuesday, Thursday.

4-Days a Week Split Program:

- A more advanced training program.
- Split 1st half of workout routine and perform on 2 days of the week.
- Split 2nd half of workout routine and perform on 2 other days of the week.
- Usually involves more exercises.
- Example weekly routine #1:
    - Upper Body Exercises Monday/Thursday
    - Lower Body Exercises Tuesday/Friday
- Example weekly routine #2
    - Chest, Shoulders, Arms - Monday/Thursday
    - Legs and Back - Tuesday/Friday

Advanced Weight Lifting Programming

In the FiTOUR® Primary Personal Trainer Certification, the goal of resistance training was to develop a muscular strength and endurance foundation for the client by developing a basic 6-week resistance program. The following information relates to the client who has established a foundational resistance program. This information can be used to customize a weight lifting program to achieve specific goals.

Weight Training Variables

1. Load: The amount of weight being lifted sometimes a percentage of one's 1RM.
2. Reps: The execution of an exercise one time.
3. Sets: The number of repetitions consecutively performed in an exercise without rest.

The 3 Main Weight Training Goals

1. To develop muscular endurance.
2. To develop muscular hypertrophy.
3. To develop muscular strength.

Muscular Endurance Weight Training Program

- Muscular endurance defined: The capacity of a muscle to repeatedly contract over a period of time without undue fatigue.
- Example athletes: Runner, triathlete, and swimmer.
- Relative weight loading: Light
- % of 1RM: 60%-70%
- Rep range: 12-20
- # of sets: 2-3
- Rest between sets: 20-30 seconds.

Muscular Hypertrophy Weight Training Program

- Muscular hypertrophy defined: Muscles that are cut, defined, and are large in size. Muscle capacity that is in between muscular endurance and muscular strength.
- Example athlete: Bodybuilder
- Relative weight loading: Moderate
- % of 1RM: 70%-80%
- Rep range: 8-12
- # of sets: 3-6
- Rest between sets: 30-90 seconds.

Muscular Strength Weight Training Program

- Muscular strength defined: The ability of a muscle to exert maximal force in a single effort.
- Example athletes: Power lifter and football player.
- Relative weight loading: Heavy
- % of 1RM: 80%-100%
- Rep range: 1-8
- # of sets: 3-5 or more
- Rest between sets: 2-5 minutes.

Determining 1RM: Choose a load and lift it as many times as possible, but do not exceed 12 reps.

- Brzycki Equation: Weight (load) ÷(1.0278 - (0.0278 X number of repetitions)) = 1RM
- Alternate Equation: Weight (load) X (1 + (0.033 X number of repetitions)) = 1RM

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 agility:

2. Briefly list and explain the agility run ratings:

3. Define speed:

4. Explain how to perform the test to measure power:

5. Briefly explain the differences between two types of skills—(1) Motor Skill and (2) Motor Perceptual.

Skill

Definition: An ability that has been acquired by training. A task that can be performed well and reproduced on command.

The difference between *Health* related fitness and *Skill* related fitness is *Health* related fitness emphasizes the efficiency of the human body whereas *Skill* related fitness is related to playing sport and is very specific. When we choose to move, the action is controlled by the conscious brain using a collection of learned movements. For the movement to progress successfully, the client requires information feedback.

Types of Skills: Although there are different types of skills including cognitive and perceptual, the types of skill addressed here are motor and motor perceptual.

- Motor Skill - Movement and muscle control
- Motor Perceptual - Involves the thought, interpretation, and movement skills

Methods of Teaching a Skill:

- Video
- Verbal instructions.
- Demonstration
- Photo sequences.
- Diagrams
- Technique drills - Appropriate drills should be identified for each client to improve specific aspects of technique or to correct faults. Drills should be selected to produce a specific effect. e.g. Running drills are used to develop important components of proper and economical running technique. Whichever drills are used they must be correct for the required action.

Assessing Skill Performance: Initially, compare visual feedback from the client's movement with the technical model of the specific activity to be achieved. Clients should be encouraged to evaluate their own performance. In assessing the performance of a client consider the following points:

- Are the basics correct ?
- Is the direction of the movement correct ?
- Is the rhythm correct ?

It is important to ask athletes to remember how it felt when correct examples of movement are demonstrated (kinesthetic feedback). Appropriate checklists/notes can be used to assist the personal trainer in the assessment of a client's technique.

Example Skill Assessment: Running - Compare a client's actual running performance with the proper running technique.

Determining Skill Inefficiencies: Having assessed the skill performance and identified that there is a deficiency, the personal trainer needs to determine why this is happening. Inefficiency can be caused by :

- Incorrect understanding of the movement by the client
- Poor physical abilities
- Poor coordination of movement
- Incorrect application of power
- Lack of concentration
- Inappropriate clothing or footwear
- External factors e.g. weather conditions

Improving Skill: Practice. Skills will improve over time and repetition.

Reaction Time

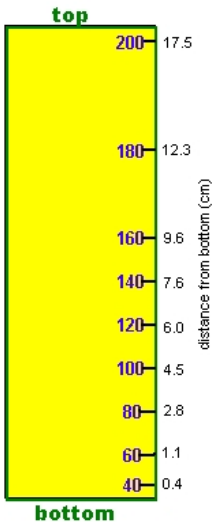
Definition: The ability to respond quickly to stimuli. When the body or brain is stimulated, the stimuli is registered in the brain. The part of the brain at which the stimuli is registered sends a message to another part of your brain that controls the muscles. The brain then sends a signal to the muscles, telling them to react. Signals travel fast along each of the nerve pathways required, however the majority of the reaction time is taken up at the junction points in between the different nerves involved, and between the nerves and the muscles at the moving muscles.

Reaction time is important in many sports and day-to-day activities, though it is not often measured. As with all sports fitness testing, specificity is very important, and if you were to seriously want to measure an athlete's reaction time in a certain sport, you would want a test that is more specific to the visual cues and muscle reactions that are encountered during that sport.

Measurement: Dropped Ruler Test This test is for fun!!

- Equipment Required:
  - A piece of thick paper or cardboard, approximately 20cm long and 5cm wide.
  - A ruler
  - A pen or pencil
- Description and Set Up:
  - Construction Method
    - Cut the card to at least 20cm long and 5cm wide (see figure on right)
    - Mark the piece of paper or cardboard as illustrated.
    - The numbers 40 to 200 (time in milliseconds) are to be written on the card at the specified distances (in cm) from the bottom of the card.

      Note: all measurements are approximate



- Procedures:
  - The personal trainer holds the reaction timer at the top
  - The client lines up the fingers with the bottom edge of the reaction timer
  - The personal trainer drops the reaction timer at any time, without warning. The client tries to grab the timer between the fingers. The client should not chase it, that's cheating.
- Results:
  - The table below gives rating scores for the test.

Speed (Milliseconds)	Rating
40	Great—Very Fast
60	Good—Fast
80	Above Average
120	Average
140	Slow
160	Very Slow
180	Try Again
200	Wake UP!!!

Power

Definition: The ability to exert muscular strength quickly. The product of speed and force (Speed X Force = Power).

Force—Any push or pull that tends to cause movement.

Measurement: Standing Long Jump (Explosive Power)

- Description and Set Up: This test measures one's explosive power. Warm up thoroughly before you begin with a few minutes of light jogging and stretches to all major muscle groups. Avoid training the day before, especially heavy weight training which will have a significant effect on the results.

  Make a mark on the ground.

- Procedures: Stand at a mark with your feet slightly apart. Taking off and landing with both feet, swing your arms and bend the knees to jump forward as far as possible. Measure the distance, rest fully and repeat a total of 3 times. Take the longest of the 3 trials as your score.
- Equipment Required: Flat non-slip surface and measuring tape.
- Results: The table below gives rating scores for the test.

Standing Long Jump Test					
	Poor	**Below Average**	**Average**	**Good**	**Excellent**
MALES	<2.0	2.3m	2.5m	2.7m	>3.0m
FEMALES	<1.7m	1.9m	2.2m	2.5m	>2.8

Speed

Definition: The ability to move the body quickly or the velocity at which one moves.

Measurement: 30m Sprint (98.4 ft)

- Description and Set Up: This test measures the ability to accelerate to full speed quickly, as well as reaction time. Warm up thoroughly before you begin with a few minutes of light jogging and stretches to all major muscle groups. Avoid training the day before, especially heavy weight training which will have a significant effect on the results. Set up 2 cones 30m (98.4 ft) apart and start at one cone.

- Procedures: On a signal of "Marks - Set - GO" sprint to the other cone as quickly as possible. Have a training partner record your time with a stop watch. Perform 3 trials and take the best time.

- Equipment Required: Flat non-slip surface, cones, stopwatch, measuring tape.

- Results: Any time less than 5 seconds is good. Less than 4 seconds is excellent.

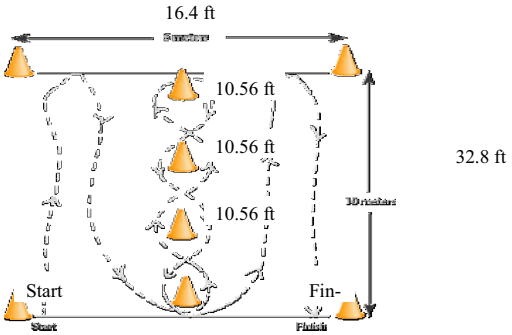
Fitness Performance Components and Measurement

Once an individual has developed a foundational fitness level through a basic 6-week comprehensive fitness program that targets the basic 5 components of fitness (cardiorespiratory fitness, muscular strength, muscular endurance, flexibility, and body composition), the personal trainer can begin to implement more advance training that targets one's fitness performance. The 5 Fitness Performance Components include, agility, speed, power, reaction time, and skill.

Agility

Definition: The ability to start, stop, and move the body quickly in different directions.
Measurement: The Illinois Agility Test

- Diagram:



- Description and Set Up: The length of the course is 10 meters and the width (distance between the start and finish points) is 5 meters. 4 cones are used to mark the start, finish and the two turning points. Another four cones are placed down the center an equal distance apart. Each cone in the center is spaced 3.3 meters apart.
- Procedure: Subjects should lie on their front (head to the start line) with hands by their shoulders. On the 'Go' command the stopwatch is started, and the athlete gets up as quickly as possible and runs around the course in the direction indicated, without knocking the cones over, to the finish line, at which the timing is stopped.
- Equipment Required: Flat non-slip surface, cones, stopwatch, measuring tape.
- Results: The table gives rating scores for the test.

Agility Run Ratings (Seconds)		
Rating	**Males**	**Females**
Excellent	<15.2	<17.0
Good	16.1-15.2	17.9-17.0
Average	18.1-16.2	21.7-18.0
Fair	18.3-18.2	23.0-21.8
Poor	>18.3	>23.0

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 #3 Review Questions

1. Briefly list and explain the categories of functional strength.

2. List three examples of functional strength exercises:

3. What is a method of testing lower body functional strength?

4. Define functional flexibility:

5. Define muscle coordination:

6. Explain how to quickly perform both a front and side assessment of a client's posture.

Advanced Functional Assessments

Postural Alignment

Definition: The position of the body; the situation or disposition of the several parts of the body with respect to each other, or for a particular purpose. Optimal posture and alignment help to provide good shock absorption, assist in weight acceptance, and promote the transfer of energy during movement. In other words, optimal posture allows the body to move more efficiently, fatigue less easily, and place less stress on the joints. Optimal posture will assist in the prevention of overtraining, muscle imbalances, and decreased performance. Posture helps determine which muscles are strong and weak by lengthening or shortening certain muscles. There is an optimum length at which the muscle is capable of developing maximal tension. By assessing one's posture, muscle imbalances can be determined.

Postural Misalignments:

Hyperlordosis or Swayback

Definition: There is an extreme arch in the lower back area of the body. This usually means the back is tight and the abdominals are weak.

Correction: To help correct this misalignment, one should focus on stretching the back and strengthening the abdominals.

Kyphosis

Definition: Convex curvature of the spine which results in the shoulders rounding forward and the buttocks tucking under. The upper back is usually weak and the chest is tight.

Correction: Perform exercises to stretch the chest and strengthen the upper back muscles.

Flat Back

Definition: The spine is completely straight with no normal curvature.

Correction: Perform functional core and lower back exercises.

Supination

Definition: The feet roll outward causing pain in joints and shins.

Correction: When exercising, wear cushioned, neutral shoes that have no motion control.

Pronation

Definition: The feet roll inward (flat feet) and the knees tend to collapse inward. This rolling inward usually means tight posterior muscles and iliotibial band.

Correction: Use orthodics in the shoes and stretch tight hamstrings and gastrocnemius muscles along with the outer hip muscles.

Hyperextended Knees

Definition: A condition in which the ligaments and connective tissues around the knee are too loose. The back tends to sway as well causing tight back muscles and weak abdominal muscles. When assessing hyperextended knees from a side view, the leg looks as though it bends backward.

Correction: Strengthen the knee joints by performing leg extensions and isometric yoga-type exercises.

Quick Assessment Questionnaire of Client's Posture: While working with a client ask yourself the following questions regarding your client's posture.

Front Assessment

1. Does client's head tilt to one side?
2. Are the shoulder's level?
3. Are the hips level?
4. Are the feet flat causing the knees to collapse?

Side Assessment

1. Does the head jut forward?
2. Do the shoulders round or slouch forward?
3. Does the pelvis tilt forward or backwards causing excessive curvature or rounding of the lower back respectively?

Advanced Functional Assessments

Muscle Balance/Imbalances…..Con't

2. **Static Measurement:** The Stork Test

- Procedure: The Stork Test monitors the development of ability to maintain a state of equilibrium (balance) in a static position. Have the client stand comfortably on both feet and place hands on hips, lift one leg and place the toes of that foot against the knee of the standing leg. The personal trainer commands the client to raise the heel of the standing foot and stand on the toes. The personal trainer starts the stop watch. The client balances on one foot for as long as possible without letting either the heel touch the floor or the other foot move away from the knee of the standing leg. The personal trainer records the time for which the client balanced. Repeat on the other leg.

- Equipment Required: Warm and dry area (like a gym). Stopwatch.
- Results: The table below gives rating scores for the test.

Excellent	Above Average	Average	Below Average	Poor
> 50 Secs	40-49 Secs	26-39 Secs	11-25 Secs	< 11 Secs

3. **Isokinetic Muscle/Joint Imbalance Testing:** To truly test the imbalances of joints and muscles, one can use *specialized Isokinetic machines*. For supplemental information, the below chart gives specific agonist and antagonist joint movements that can be tested for imbalances. Where there is an imbalance, then the personal trainer and client need to devote more training attention to the muscle group of the weaker limb. Isokinetic imbalance testing is generally limited to specialized facilities that have the specialized equipment on site (i.e. rehabilitation and hospital facilities).

Joint	Movement	Joint	Movement
Ankle	Plantar Flexion/Dorsi Flexion	Shoulder	Flexion/Extension
Ankle	Inversion/Eversion	Elbow	Flexion/Extension
Leg	Extension/Flexion	Lumbar	Flexion/Extension
Hip	Extension/Flexion		

4. **Postural Inspection:** A number of tests are available to assess muscle imbalance including postural inspection. Inspection of posture provides a quick screen.

Muscle	Sign of Lengthening or Inhibition
Transverse abdominus	Navel out
Serratus anterior	Winging scapulae
Lower trapezius	Elevated shoulder girdle
Deep neck flexors	Forward head when viewed from the side
Gluteus medius	Unleveled pelvis with one leg standing
Gluteus maximus	Sagging buttock

Advanced Functional Assessments

Muscle Balance/Imbalances

Definition: The relationship between the tone or strength and length of the muscles around a joint is known as muscle balance. When examining a client, the personal trainer should assess stationary and dynamic strength and length. Muscles can be divided into two types: mobilizers and stabilizers. These two groups of muscles have quite different characteristics.

Mobilizers: Mobilizers are found close to the body's surface and tend to cross two joints. They are typically made up of fast twitch fibers that produce power but lack endurance. With time and use they tend to tighten and shorten. Mobilizers assist rapid or ballistic movement and produce high force.

Stabilizers: Stabilizers, in contrast to mobilizers, are situated deeper, invariably only cross one joint and are made up of slow twitch fibers for endurance. They tend to become weak and long with time. Functionally, the stabilizers assist postural holding and work against gravity.

Imbalance: While initially both groups of muscles work in a complementary fashion to stabilize and move, over time the mobilizers can inhibit the action of the stabilizers and begin to move and attempt to stabilize on their own. This inhibition of the stabilizers and preferential recruitment of the mobilizers is central to the development of muscle "imbalance". Detection of this muscle "imbalance" can assist the personal trainer in assisting a client in reversing and correcting muscle imbalance.

Two Types of Balance:

1. Dynamic Balance - The type of balance in movement in which there is a loss and regaining of balance. Example is walking.
2. Static Balance - The type of balance with little or no movement and is maintained under unfavorable conditions. Example is standing on one foot.

Measurement:

1. Dynamic Measurement: See Functional Strength Measurement (See Page 15).

A speed strength imbalance between two opposing muscle groups may be a limiting factor in the development of speed. Muscle balance testing to compare the strength of opposing muscle groups is important to prevent injury and guarantee maximum speed of muscle contraction and relaxation. Muscle imbalance inhibit speed and cause injury.

After testing for Functional Strength, perform a balance check for the below muscle groups for each side of the body.

For each of the following exercises listed below, the right and left limb 1RM scores should not differ by more than 10%.

- Hamstrings (leg curl)
- Quadriceps (leg extension)
- Arm curl
- One arm military press
- Single leg press

Advanced Functional Assessments

Muscle Coordination

***Definition*:** The ability to use the senses and body parts in order to perform motor tasks smoothly and accurately. Coordination is the capacity to move through a complex set of movements.

Coordination is dependent on the interaction of multiple body organs and systems including the eyes, ears, brain and nervous system, cardiovascular system, and muscles. Testing or examination of any or all of these organs or systems may be necessary to determine the causes of loss of balance, dizziness, or the inability to coordinate movement or activities.

Coordination is influenced by the genetic make up of individual, as well as the individual's imagination, acquired skills and experience. During human development, coordination improves along with the state of nervous system.

Measurement: Ball Toss - Coordination is typically assessed using measures of hand-eye or foot-eye coordination such as juggling, dribbling a ball or hitting an object. There are, however, many different types of coordination and total assessment of coordination would require many different tests.

- Equipment Required: Flat wall and a ball about the size of a tennis ball.
- Procedure: Client should stand about 5 feet away from the wall. Throw the ball underhandedly with the right hand against the wall and catch the ball with the left hand. Throw the ball against the wall with the left hand and catch the ball with the right hand. Repeat this throwing pattern for 2 minutes.
- Results: This exercise will become easier as hand-eye coordination improves.

Advanced Functional Assessments

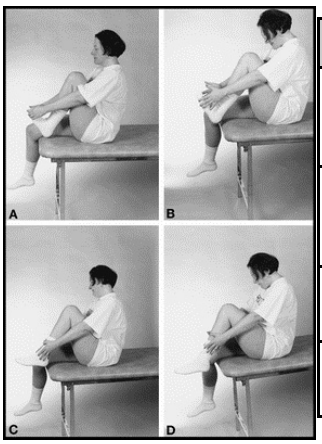
Functional Flexibility

Testing for Functional Flexibility:

1. The Sock Test

The Sock Test simulates the activity of putting on a sock. The test is standardized and does not allow alternative ways of moving. The personal trainer evaluates the client's performance, observing how far the patient reaches and how easily the activity is done. The client should wear loose clothing. The activity is first demonstrated to the client. The client is then instructed to sit on a high bench, with the feet not touching the floor. The client lifts up one leg at a time in the sagittal plane and simultaneously reaches down toward the lifted foot with both hands, one on each side, grabbing the toes with the fingertips of both hands. The foot must not touch the bench and should be in the air at all times during the test. After testing each leg once, the client is given a score on the most limited performance. Scores are given as ordinal values from 0 (can grab the toes with fingertips and perform the action with ease) to 3 (can hardly, if at all, reach as far as the ankle joint) (Fig. 1). Several compensation maneuvers might be demonstrated. Compensations are not scored. If they occur, the test is explained or demonstrated to the patient again before the test is repeated. Examples of compensating include 1) abducting the leg/knee out to the side to reach the toes and 2) pulling the leg up close to the body to touch the toes.

Figure 1



Score	Description of Function
Fig 1.A Score 0	Client can grab toes with fingertips and perform the action with ease.
Fig 1.B Score 1	Client can grab toes with fingertips but performs the action with effort.
Fig 1.C Score 2	Client can reach beyond the ankle joint, but cannot reach the toes.
Fig 1.D Score 3	Client can hardly, if at all, reach as far as the ankle joint.

2. Fingertip-to-Floor Flexibility Measurement

The measurement of the fingertip-to-floor distance is compared with the normal distance of 20 centimeters or less. One simply bends from the hips and extends the fingertips to the floor. If he/she is 20 centimeters or less from the floor, he/she is considered normal in functional flexibility. The goal of a personal trainer is to work with a client in functional flexibility to where he/she will be able to touch the floor with the fingertips.

Advanced Functional Assessments

Functional Flexibility

Definition: The ability of the individual parts of the skeleton to easily, freely, and fluidly float through full range of motion without discomfort or pain.

Myth #1: One needs to stretch into contorting positions like practiced in yoga in order to be functionally flexible.
Truth: Contortion-ability comes from over-stretching tendons across joints or hyper-loosening specific joints. Over-stretching tendons and hyper-loosening joints through extreme contortion isn't necessary for achieving **Functional Flexibility**, and is to be avoided, as it can cause or increase the risk of injury.

Myth #2: One should obtain functional flexibility through conventional stretches.
Truth: Conventional stretching is linear and isolated in nature because individual muscles are addressed on a single plane. One should work dehydrated, disorganized tissue with a three-dimensional movement of the bone it connects and the joints and hinges it crosses. Comprehensive and systematic skeletal range of motion movements will improve and develop functional flexibility.

Example Functional Flexibility Exercises: The exercises listed below challenge the whole body to maneuver in three-dimensional space rather than stretching in one linear plane of movement.

1. Flexing and releasing muscles with a foam roller (abductor muscles are an example).
2. Flexing and releasing muscles with exercise tubing or a rubber band.
3. Flexing and releasing muscles with the assistance of a towel or strap.
4. Pilates full range of motion type movements.
5. Tai Chi exercises.

Advanced Functional Assessments

Functional Strength

Testing for Functional Strength: A speed strength imbalance between two opposing muscle groups may be a limiting factor in the development of speed. Muscle balance testing to compare the strength of opposing muscle groups is important to prevent injury and guarantee maximum speed of muscle contraction and relaxation. Muscle imbalance can slow you down and result in injury.

Lower Body Functional Strength Tests

Leg press/body weight ratio: Leg strength/body weight ratio indicates how easily an individual can get and keep the body moving at high speeds. This ratio is important to speed improvements in short distances. A good ratio is 2.5:1 or a leg press score of two and half times body weight. If it is less than 2.5, consider modifying the program to develop leg strength.

1. Total Leg Strength: The squat is considered the most functional leg strength test in predicting sprinting and jumping ability. Good 1RM/One Rep Max (see below to determine 1RM) scores are:

- Male athletes 2 X "Body weight"
- Female athletes 1.5 X "Body weight"

2. Hamstring/Quadriceps Strength: For each leg record the 1RM for the leg curl and leg extension exercises. Divide the leg extension score by the leg curl score to find the ratio for each leg. For each leg the curl score should be at least 80% of the leg extension score. If the score is less than 80%,devote more training attention to the hamstrings. To reduce the chance of injury the ratio should be at least 75%.

Upper Body Functional Strength Tests

Bench Press: This is a test for upper body strength. The need for maximum upper body strength varies between sports and so it does not always need to be tested. Good 1RM (see below to determine 1RM) scores are:

- Male athletes 1.25 X "Body weight"
- Female athletes 0.8 X "Body weight"

Balance Check: Once functional strength has been tested, check for muscle balance in each limb. (See Page 19)

Determining 1RM: If one needs to determine maximum load (1RM) for a weight training exercise then there is a way of obtaining an approximate value based on a weight and the number of repetitions one can perform to exhaustion for that exercise. The following equations provide a good estimate of the maximum load providing the number of repetitions does not exceed 12.

Brzycki Equation: Weight ÷ (1.0278 - (0.0278 X number of repetitions)) = 1RM
Alternate Equation: Weight X (1 + (0.033 * number of repetitions)) = 1RM

Advanced Functional Assessments

Functional Strength

Definition: Training the body to better perform movements that are performed in everyday living.

Categories of Functional Strength

1. Lifting: Picking up one's children.
2. Reaching: Grabbing a shirt that is folded on the top shelf of the closet.
3. Balancing: Standing on a chair as one changes a light bulb.
4. Power: Walking up hill.
5. Combinations of the above or similar activities of daily living.

Exercise Equipment for Functional Strength Exercises

1. Dumbbells
2. Barbells
3. Elastic or rubberized resistance equipment.
4. Exercise balls.
5. Medicine balls.
6. Steps
7. Body weight.

Example Functional Strength Exercises: These exercises challenge the whole body to control and balance the weight in three-dimensional space, rather than letting the machines do the work.

1. Walking lunges with dumbbells.
2. Squats with a barbell.
3. Swimming using the elastic tubing or bands.
4. Abdominal Crunches on an exercise ball.
5. Passing a medicine ball while doing abdominal crunches.
6. Step-ups on a Step or bench.
7. Dips using body weight.

Advance Functional and Fitness Performance Assessment Record

This form can be used to record a client's performance during advanced functional and fitness performance. By maintaining and recording assessment scores, a client's progress can be easily tracked and adjustments can be made to a program to continue to improve performance. This form may be copied or adapted from the "Forms" section in the back of this manual.

TEST	SCORE	RETEST SCORE
Functional Strength Tests		
Total Leg Strength Test		
Hamstring/Quadriceps Strength Test		
Bench Press		
Functional Flexibility Tests		
Sock Test		
Fingertip-to-Floor Test		
Muscle Coordination - Ball Toss Test		
Muscle Balance/Imbalances Tests		
Dynamic Measurement		
Static Measurement: The Stork Test		
Postural Inspection		
Postural Alignment - Quick Assessment		
Agility - The Illinois Agility Test		
Speed - 30m Sprint Test		
Power - Standing Long Jump Test		
Reaction Time - Dropped Ruler Test		
Skill Assessment		

***NOTE: Retest every 3 months.**

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. Name five benefits of physical fitness:

2. Can exercise have an effect on mood?

3. Define muscle dysmorphia.

4. Define body image.

5. Define body dysmorphic disorder.

6. Define obsessive compulsive disorder.

.

Exercise Psychology and Behavioral Science

- **Effects of Exercise on Mood**

  Exercise and Anxiety

  - Research supports the conclusion that exercise reduces anxiety in individuals.

  Exercise and Depression

  - Depression Defined: Characterized by withdrawal, inactivity, and feelings of hopelessness and loss of control.
  - Exercise has become a therapeutic intervention in depression.
  - Running has received the most recognition in treating depression.

- **Overtraining Syndrome** **(See Page 33)**

- **Body Image/Obsessive Compulsive Disorder (OCD):** As a personal trainer, one should be aware of common body image and eating disorders that may arise within the client. The personal trainer should not diagnose these disorders, but may refer his/her client to a specialist.

  Definition of Body Image: Theoretically defined as how one views one's body and how one believes others view one's body. Some individuals have an extremely distorted body image which can drive one to be obsessive about working out.

  Definition of Obsessive Compulsive Disorder (OCD): Some clients may become over zealous and workout too much which can lead to overuse injuries. The individual may have a latent problem such as OCD. This disorder can be defined theoretically as having unwanted ideas or impulses that repeatedly consume one's mind. Working out could potentially become addicting whether it be positive or negative.

  Definition of Body Dysmorphic Disorder (BDD): The preoccupation with an imagined or slight defect with a specific body part, i.e., nose, hair, or skin.

- **Common Eating Disorders**

  Anorexia Nervosa: Refusal to maintain normal body weight even though grossly underweight

  Bulimia: An act of binge eating and purging to gain a sense of control over weight or other issues in one's life.

- **Muscle Dysmorphia (Reverse Anorexia):** A subtype of BDD that is characterized by the preoccupation of one's overall body. One with MD has a distorted body image that is opposite of one with anorexia. One with MD sees a very underweight body and workouts continuously to get more and more muscular. This disorder may also be the cause of anabolic steroid use.

- The person has a preoccupation with the idea that one's body is not sufficiently lean and muscular leading to excessive weightlifting and dieting.
- The primary focus of the preoccupation and behaviors is on being too small or inadequately muscular as opposed to the fear of being fat (anorexia nervosa) or the preoccupation with only one body part (BDD).
- The preoccupation causes significant distress in social, occupational, or other areas as demonstrated by at least of two of the following criteria.

  1. The individual gives up social, occupational or recreational activities because of the need to maintain workout and diet regimen.
  2. The individual avoids or markedly endures situations in which his/her body is exposed.
  3. The preoccupation about the insufficient muscularity is clinically distressful in social and occupational functions.
  4. The individual continues to exercise, diet or use ergogenic substances despite physiological or psychological adverse affects.

Exercise Psychology and Behavioral Science

♦ Exercise Adherence and Compliance

1. The inability to maintain an exercise regimen is one of the more perplexing problems facing professionals in various health-related enterprises.
2. 50% of all who start a fitness campaign will drop out in 6 months or less.

Positive Predictors of Exercise Adherence

1. Physical proximity to the exercise area.
2. Spousal or significant other support.
3. Exercising in small groups as opposed to large groups.
4. Socioeconomic status.
5. Intrinsic motivation.

Negative Predictors of Exercise Adherence

1. Lack of time.
2. Accessibility
3. Smoking
4. Poor choice of mode of exercise.
5. Injury
6. Type A personalities going too hard too soon.

Improving Exercise Adherence

1. Agreement to a Behavioral Contract between personal trainer and client.
2. Maintain objective records of exercise regimen.
3. Stimulus Cueing - Exercising using the same activity at the same time and place everyday.
4. Set and record goals.
5. Reinforcement and reward for meeting goals.
6. Begin an exercise program with low intensity and gradually progress.

Exercise Psychology and Behavioral Science

Definitions:

Physical Activity - Any bodily movement produced by the skeletal muscles that results in an expenditure of energy. This bodily movement can be an organized exercise method or as simple as a mother running around after her children.

Exercise - A subset of physical activity that is characterized by planned, organized, and repetitive components aimed at improving or maintaining physical fitness.

Physical Fitness - A set of attributes that are either health or skill related.

Physical Benefits of Physical Fitness

1. Increased blood flow to the heart.
2. Lowered blood pressure.
3. Lowered cholesterol.
4. Increased lung capacity.
5. More efficient delivery of oxygenated blood to the all parts of the body.
6. Control of hypertension.
7. Control of diabetes.
8. Control of osteoporosis.
9. Weight control.
10. Increased muscle mass.
11. Increased metabolism.
12. Lowered resting heart rate.

Psychological Benefits of Physical Fitness

1. Anxiety and stress reduction.
2. Socialization
3. Ageless confidence.
4. Thrill of competition for the more those who enjoy competition.

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. Define and explain intrinsic motivation:

2. Define and explain extrinsic motivation:

3. Define and explain amotivation:

4. What is the benefit of having a client complete a goal setting questionnaire?

5. What are the 3 dimensions of behavioral change?

BEHAVIORAL CHANGE CONTRACT

I _____(client) do agree that I will adhere to the suggested exercise and diet guidelines as set forth by _____ (trainer):

1. I will attend all scheduled Personal Training Sessions at _____am/pm on _____(day(s)) for _____ weeks beginning on _____, 20___ and ending on _____, 20___.

2. I will keep a daily journal in which I record daily exercise activities.

3. I will keep a daily journal in which I record food and calorie consumption.

4. I commit to having positive thoughts and engaging in positive behavior.

5. I commit to letting go of habit patterns that are unhealthy and negative and that have kept me from successfully reaching my goals in the past.

6. I commit to forming new habit patterns that are healthy and positive to replace the old habit patterns in a constant effort to improve the areas of my life that I identified as needing improvement.

7. I commit to advising the _____ (trainer) of any injury or illness I experience.

8. I commit to asking for modified exercises if the execution an exercise being performed during any training sessions results in pain or feels as if it could cause injury.

9. I commit to taking each day one at a time and to making positive changes every day.

10. At the conclusion of the time period listed above, I commit to adopting and maintaining all of the positive changes and new habit patterns formed during the training program.

Signed _____ Date _____

- **Relatedness:** Sense of shared experience.
    - Take the time to get to know your clients and their personalities.
        - *Do you like being talked to during a training session?*
        - *Do you like for me to count repetitions for you or do you prefer to count your own repetitions?*
    - Genuinely care about your clients.
        - Be a good listener.
        - Be sensitive to your clients' moods and adjust accordingly.
        - Avoid "I's" and "me's" during a training session. This is your client's time and the focus should be on the client, not the trainer.

Asking clients to complete a **Behavioral Change Contract** after goals have been set and a plan of change has been identified is an ideal method of encouraging compliance with the personal training program which will ultimately result in the client's success. The sample **Behavioral Change Contract** on the following page can be copied or adapted for use.

For the most positive effect and outcome, the trainer should be present as the client reads and completes the Behavioral Change Contract. The trainer may actually read each step on the contract as the client completes the contract or have the client read the contract aloud as he/she completes the contract. The trainer being actively involved in the client's completion of the contract can create a bond between the trainer and client which can reinforce positive behavior toward successful completion of the set goals.

Upon review of the client's completed behavioral change contract, the trainer should refer back to the Transtheoretical Model of Change. Relate the client's completed contract to the three dimensions of the Transtheoretical Model of Change by reviewing the contract with an eye toward:

1. The client's current level in the stages of change (Dimension #1);
2. The client's attitudes, beliefs and behavior skills which influence change (Dimension #2); and
3. Identify problems or roadblocks to effecting change (Dimension #3).

Three Basic Psychological Needs
As clients find these three basic psychological needs fulfilled, they will be able to achieve goals more readily because they will be more confident in their success.

- **Autonomy :** Freedom of choice.
    - Many people are motivated to exercise to enhance their body image and may feel pressured to exercise rather than exercising because they enjoy physical activity.
        - *The trainer can assist the client in moving from extrinsic behavior to intrinsic behavior by focusing on the things the client enjoys about exercising. This can be achieved by giving clients a level of autonomy as it relates to training sessions and program design.*
            - Offer choices of various types of exercises and activities. Ask these simple questions:
                - *What exercises do you enjoy?*
                - *Are there exercises to which you are indifferent?*
                - *What exercises do you dislike?*
                    - Steer clear of the exercises that are not enjoyed and include the exercises that are enjoyed.
            - Change their definition of exercise.
                - All types of physical activity are exercise. Personal training is not found only in the weight room. Personal training can be found in the yoga or Pilates studio, the pool, the home, a park, a tennis court or soccer field – the possibilities are endless.
                    - Create a program around an activity or hobby the client enjoys.
- **Competence:** Self-perception of ability to perform well in an activity.
    - *The trainer can use feedback to boost a client's confidence which will in turn boost competence.*
        - **Positive Reinforcement -** Use general reinforcement once or twice during a training session. Continuous use of reinforcement can seem insincere. Some examples of positive reinforcement are "Good job!" or "You're doing great!".
        - **Skill-Specific** – When a client performs a new skill or a difficult skill, provide skill-specific feedback the first few times a client is able to perform a skill successfully or with improvement.

After a Plan of Change has been set in place, it needs to be understood that changes in behavior will not automatically occur.

Dimension 2 - Attitudes, Beliefs and Behavior Skills Which Influence Behavior Change:

Self-efficacy – Confidently adopting positive behavior and avoiding undesired behavior.

Decisional balance – Weighing the pros and cons when making choices regarding healthy lifestyle.

Process of change – Experientially and cognitively using thoughts, attitudes and awareness to elicit change by gaining knowledge of how to make changes (experientially and cognitive) and then setting forth a plan to change (behavioral).

Example: Reading literature on the benefits of walking for weight loss is a cognitive process, and setting reminders on calendar is a behavioral process both of which will bring about change.

Dimension 3 - Level of Change:

What is the root of the problem? There are more problems than could possibly be listed. Question client to determine root of problem. Then work with client to find a solution to the problem.

Problem: Time
Solution: 30 minute training session

Problem: Money
Solution: Consultation sessions once every 4-6 weeks for a workout to do alone. Follow-up consultations to re-assess and assign new program every 4-6 weeks.

Problem: Spouse/Family
Solution: Explain to spouse/family the importance of adopting a healthy lifestyle and how it will make a better parent and spouse.

A personal trainer with the correct tools and approach can be an integral part in a client making lifelong changes in behavior that may be detrimental to their health and may ultimately keep them from reaching their fitness goals. While total change may not occur in a specific or set amount of time, the foundation for change can be set.

PLAN OF CHANGE
IDENTIFY HABIT PATTERNS THAT CREATE ROADBLOCKS

1. Food Choices

2. Exercise Choices

3. Unhealthy or Negative Thoughts

4. Unhealthy or Negative Behavior (smoking, alcohol, drug abuse, caffeine, diet sodas, etc.)

5. Daily Activities/Habits: Briefly examine the activities of a typical day. List each activity and the time you generally participate in that activity.

AM:

Mid-AM:

Noon:

Mid-Afternoon:

Early PM:

Late PM:

Transtheoretical Model of Behavior Change: To be an effective and successful personal trainer, it is important to understand the basics involved in behavior change and the skills needed to motivate change. Change is not instantaneous. It is a process which occurs through different stages over a period of time. Behavior is learned and can be changed when bad habits are identified and the consequences of not changing are understood.

3 Dimensions of the Transtheoretical Model of Change: In order to assist a client in making changes, it is important to evaluate the client with respect to these three dimensions. Having the client complete a **Plan of Change** will identify specific habit patterns that create roadblocks to the client's success:

Dimension 1 - Stages of Change:

#1 Precontemplation – In this stage, the client can be in denial that change is necessary or not have seriously thought about making any lifestyle changes in the next six months.

Trainer's goal in this stage is to get people thinking about making lifestyle changes to include increased physical activity.

#2 Contemplation – Client is seriously considering making lifestyle changes within the next six months.

Trainer's goal in this stage is to prepare client to take action by providing information on how to be more active.

#3 Preparation – This is transitional stage from Contemplation to planning and preparing to make lifestyle changes within the next month.

Trainer's goal is to assist in resolving barriers that may be in the way of adopting physical activity by setting goals and providing a fitness program.

#4 Action – Occurs six months *after* client makes changes to lifestyle. This is the least stable stage of change and drop-out during this stage is highest.

Because this stage has the highest risk of drop-out, it is important for the trainer to use strategies to decrease the risk of drop-out. The trainer and client should work together to identify situations which may put the client at risk of drop-out. After a situation is identified, develop a strategy to avoid or overcome the situation.

#5 Maintenance – After the client has maintained healthy lifestyle changes for over six months, there is less chance of drop-out. The longer a client maintains healthy lifestyle changes, the less risk of drop-out**.**

Once a client has moved from the action stage into the maintenance stage, incorporate strategies to encourage maintenance. These strategies can include reevaluation of goals and providing advice on how to handle circumstances which may get in the way of exercise such as travel, illness or family/ work responsibilities.

GOAL SETTING QUESITONNAIRE

DEGREE of SATISFACTION with Current Level of Fitness *Check the best number for each aspect of your current fitness level, using this scale:* *4 = Very Satisfied 3 = Satisfied 2 = Dissatisfied 1 = Very Dissatisfied*	**4**	**3**	**2**	**1**
Amount of Energy				
Cardiovascular Endurance				
Muscular Strength & Endurance				
Flexibility of Hamstrings and Low Back				
Ability to cope with tension & stress				
Ability to relax				
Ability to get a good night's rest				
Low-back function				
Physical appearance/Body Weight				

AREAS OF IMPROVEMENT
Take a few moments to think about the areas of your life which you feel need improvement. Briefly list areas of improvement below.

1. Specific Physical Problem:

2. Appearance of Particular Part of Body:

3. Ability to Participate in a Specific Sports (i.e. tennis, skiing, running, etc.)

4. Risk of a Health Problem:

5. Other:

Motivation and Goal Setting

Three Types of Motivation

- **Intrinsic Motivation:**
  - Emerges from positive self-concept.
  - Most ideal form of energy used.
    - Intrinsically motivated individuals are competent and take pride in mastering a task or being successful in accomplishing a goal.
- **Extrinsic Motivation:**
  - Comes from an outside source. For example, working out compulsively to avoid negative effect of being out of shape and overweight.
  - The focus is on the outcome instead of the process of achievement.
    - Extrinsically motivated individuals need to be encouraged to change their focus from looking a certain way to enjoying the positive benefits of exercise which, in turn, will result in improved appearance as well as improved fitness.
- **Amotivation:**
  - A state in which there is a complete absence of motivation.

Goal Setting: To effect change, it is important for a client to identify specific goals and for the trainer to understand those specific goals. While a client may have a vague sense of specific goals, he/she may not be able to adequately voice those goals to the trainer. This is especially true if the client and trainer have just met and are beginning a new relationship. The client may be anxious or nervous and may be reluctant to voice actual issues that may need to be addressed before embarking on reaching specific goals.

Asking the client to complete a **Goal Setting Questionnaire** can be helpful in identifying his/her individual **degree of satisfaction with current level of** fitness and **areas of improvement** . The information obtained through completion of the questionnaire will provide the trainer with insight into the client as an individual and which help the trainer better devise a plan with the best approach to the client's success in obtaining the set goals.

Table of Contents

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