1. Name three major components of an overall physical activity program:
   -
   -
   -

2. List and Describe three benefits of weight training:
   -
   -
   -

3. What accounts for most strength gains during the initial phase of weight training?

4. List five long-term adaptations associated with weight training:
   -
   -
   -
   -
   -

5. What are the two primary muscle fibers:
   -
   -

6. Describe some of the benefits of warming-up prior to exercise:
   -
   -
   -
   -
   -

7. If your goal is to increase muscle size, what type of training load should you focus on in your workouts?

8. If muscle endurance is your primary goal, how many repetitions should you perform per set?

9. What should you do if you feel pain while exercising?
10. In order to achieve greater gains, what should you do after lifting weights?

11. Name four common mistakes made in the weight room or during weight training?
   -
   -
   -
   -

12. What do the letters in FITT stand for in weight training?

13. What does the rest period provide during a workout?

14. How do you know when to add more weight to your workout when performing exercises?

15. What is DOMS? Explain...
PHYSICAL ACTIVITY:
--Committing to participate in a physical activity program is an important step toward living a healthy lifestyle. Research has shown that maintaining an active lifestyle contributes to increased longevity and quality of life.

--The 3 components of an overall physical activity program: Aerobic exercise, flexibility training, and strength training.

  --Aerobic Exercise: Focuses on improving cardiorespiratory and cardiovascular health.
  --Flexibility: Involves stretching muscles in an effort to maintain and increase mobility.
  --Strength Training: Focuses on increasing or maintaining muscle mass through resistance exercises.

WHAT IS WEIGHT TRAINING?:
--Weight training is an effective method for improving strength, endurance and overall fitness. It involves controlled movements of skeletal muscle in an effort to move an external load (weights). This can be obtained by using free weights, machines or your own body weight. Weight training will expect body changes that include tone and strength. Weight training will help contribute to increased weight loss/control, balance, coordination and a better sense of well-being.

<table>
<thead>
<tr>
<th>BENEFITS</th>
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<tr>
<td>- <strong>Burn calories:</strong> Adding 3 lbs. of muscle increases your <em>metabolic rate</em> by 7%. This causes the daily caloric requirements to increase by 15% at rest. Your <em>Basal Metabolic Rate</em> can stay elevated for up to 24 hours after a strength training workout. Your body will burn more calories at a faster rate when weight training.</td>
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<tr>
<td>- <strong>Strong Bones:</strong> Weight training places stress on connective tissues, bones and muscles. The body responds by reinforcing areas that have been worked out. This makes them stronger and better able to handle an increased work load. It also increases the body’s protection against osteoporosis.</td>
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<tr>
<td>- <strong>Active Aging:</strong> As you age, your muscle mass, strength, endurance and bone mineral density all decrease. There is a 40%-50% decrease in muscle mass between the ages of 25-80—a 10% decrease per decade. Incorporating strength training in a lifelong commitment to physical activity to help curb the decline in muscle mass.</td>
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<tr>
<td>- <strong>Better Health:</strong> Weight training improves insulin sensitivity, lowers LOL (bad) cholesterol and raises HDL (good) cholesterol levels. Blood pressure is lowered and heart contractility improves.</td>
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<tr>
<td>- <strong>Mood:</strong> Alertness, energy and overall attitude are likely to improve.</td>
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ADAPTATIONS:
There are physiological adaptations occur at the onset of weight training program. Initial strength gains are primarily due to neural adaptations as the body learns to synchronize the nervous impulses and activate various muscle fibers in an effort to maximize force production. Muscle recruitment patterns are improved as synergistic muscle groups contribute to contractile efforts to movement. Strength gains are achieved during the beginning of a training program are a reflection of the body’s ability to learn *HOW TO WEIGHT LIFT*.

OVERLOAD PRINCIPLE: Increasing resistance through a series of training sessions effectively overloads muscle. The body responds to this progressive stress by creating more muscle to handle the additional work load. As one continues through a progression of overloading muscles, strength gains due to hypertrophy will start to occur.
**WEIGHT LOSS:** Do not expect localized fat reductions from focused weight workouts. Energy during a workout is obtained from available sources throughout the body. The key is creating an energy imbalance with caloric expenditure exceeding caloric intake. Fat will slowly disappear through dedication and commitment.

**INDIVIDUAL DIFFERENCES:** Each individual will respond in their own unique way to training programs. Physiological changes are limited by genetic disposition and applied effort. Women usually do not typically achieve bulky muscle, they will more than likely expect a leaner body due to greater fat loss with respect to muscle gain.

![Average Energy Expenditure Values:
Cycling: 30-50 kcal/mile
Running: 100 kcal/mile
Swimming: 400 kcal/mile
Strength Training: 11 kcal/min
Lose one pound: 3500 kcal](image)

**LONG TERM TRAINING ADAPTATIONS:**
--Decrease in body weight and body fat %
--Slight increase in lean body weight
--Increase in bone mineralization
--improvement in neural activation and coordination of muscles
--Increase in muscular strength and endurance
--Increase in flexibility
--improvement in fitness, quality of life and self-concept/esteem

**MUSCLE:**

Muscles are comprised of two types of muscle fibers (cells):

**Slow Twitch Muscle Fibers:** These fibers are associated with endurance activities. They contribute to force production at slow speeds of movement and longer durations

**Fast Twitch Muscle Fibers:** These fibers are associated with speed and power activities. They contribute to force production at faster speeds of movement and shorter durations.
TRAINING GUIDELINES

Exercise all major muscle groups to achieve overall fitness. Train larger muscles first, progressing to smaller muscles throughout the workout.

**UPPER BODY:** Front and back of arms, shoulders, chest, and upper back

**TORSO:** Abdominals, obliques, and lower back

**LOWER BODY:** Front and back of thighs, calves, and buttocks

**PRE-EXERCISE**

- **GET HYDRATED:** Drink a sport drink or water within an hour before exercise to ensure proper hydration.

- **WARM UP:** It is a general recommendation to perform a warm up prior to moderate or strenuous activity. A warm-up elevates the body temperature, primes the muscles for movement by increasing the blood flow, increases the speed of nervous impulses, and decreasing joint fluid viscosity. The warm-up is considered to be an important part of injury prevention.

  - Warm ups in the weight room
    - General warm ups consist of non-specific body movements (5-10 min jog or easy pedal)
    - Specific warm-ups involve muscle movement similar to the exercise performed in more strenuous activity. (50% resistance set prior to weight training activity)

- **STRETCH:** Stretching is an effective means of increasing flexibility and reducing muscle tightness. It should be performed after warming up, while resting between sets, and post exercise. Breathe slowly and methodically while stretching, holding the stretch in a relaxed state. Don’t bounce while stretching and do not push a stretch beyond personal limits. Muscle tension should diminish while holding a stretch. If you feel pain, or if tension increases you need to relax and stop pushing.

**DURING-EXERCISE**

- **DRESS PROPERLY:** Wearing comfortable clothing that allows freedom of movement is important when training. Loose baggy clothing can be a detriment to training. Wear clothing that is breathable and made for athletic activities. Shoes with the toes and heels covered are necessary equipment.

- **STAY HYDRATED:** Try to drink liquids that keeps up with sweat loss during exercise.

- **HAVE A GOAL:** During exercise, you should set goals that are measurable in order to monitor your physical progress. Some ideas for a goal could be... To increase muscularity or improve muscular endurance. Your goal will determine what you will focus on during training.

  - **GETTING LEAN:** To lose weight, calories burned must be greater that the calories consumed. A strength training program combined with proper nutrition will help achieve this goal. Circuit training and endurance training programs can help attain these goals.

  - **GAINING SIZE:** To gain muscle, calories consumed must be greater than calories burned. The key is ensuring lean muscle mass is gain, and not fat. Progressive overloading muscles during a training program with a focus on hypertrophy will help achieve this goal.

- **AVOID INJURY:** Lift weight, in a control and smooth motion. Maintain proper techniques in breathing and lifting form. STOP if you feel pain.

- **PRACTICE WEIGHT ROOM ETIQUETTE:** Share equipment between sets with other people or groups. Serve as a spotter between sets.

- **KEEP EQUIPMENT CLEAN:** Use a small towel or wipe down benches and dumbbells after use.
POST-EXERCISE

STRETCH: Research is mixed as to whether stretching aids in injury prevention. Stretching has benefits of increasing flexibility.

REFUEL: After training, you should replenish glycogen stores. Eat carbohydrate rich foods and some protein within 30 minutes of workout. (Fruits, pretzels, sports drinks)

REHYDRATE: Hydration is essential in maintaining blood volume and delivering oxygen to fuel muscles.

SAFETY AND PROPER LIFTING TECHNIQUES

While resistance training is a safe and proven method for increasing muscular strength and maintaining functional fitness, there is an inherent risk of injury made worse by improper lifting techniques. It is critical to understand and develop the necessary skills to perform exercises the right way with the appropriate resistance.

--During the early phases of resistance training programs, individuals undergo neural and physical adaptations that prepare the body for the rigors of handling an increased workload. Individuals will likely experience the effects of DOMS (Delayed Onset Muscle Soreness), if excessive strain is experienced during the eccentric phase of muscle contraction.

--The first 2 weeks of training should focus on lifting technique with a gradual increase in load. Be careful not to over train. The body need time to recover after heavy workouts.

BACK: Maintaining the normal curvature of your back during exercise will create the best support and stability. AVOID over-arching the back during lifts. Arching the back during lifts will lead to injury.

SPOTTING: A spotter serves as a measure of safety for lifts. ALWAYS use a spotter while lifting in class.

BREATHING PATTERNS: Always breathe while weight training. Exhale during the power phase of the lift. If performing a bench press, inhale while the weight is lowered to your chest, exhale while weight is pressed away from body.

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<thead>
<tr>
<th>WEIGHT TRAINING TIPS:</th>
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<tbody>
<tr>
<td>* Maintain proper nutrition and stay hydrated</td>
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<td>* Warm-up prior to exercise</td>
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<tr>
<td>* Perform exercise through a FULL RANGE OF MOTION</td>
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<tr>
<td>* Use light weights when performing new exercises</td>
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<td>* Add weight if you can perform 2 more repetitions beyond your goal for 2 consecutive workouts</td>
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<tr>
<td>* Sequence from large muscle groups to small muscle groups during exercise</td>
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<td>* Exercise your entire body</td>
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<tr>
<th>COMMON MISTAKES IN THE WEIGHT ROOM:</th>
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<tr>
<td>* Unbalanced weight-training programs (upper body only or lower body only)</td>
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<td>* Using incorrect or BAD FORM</td>
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<tr>
<td>* Overtraining</td>
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<tr>
<td>* Unfocused workouts</td>
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<tr>
<td>* Poor Gym Etiquette</td>
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<td>* Unrealistic Goals while training</td>
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DESIGNING A WORKOUT PROGRAM

Applying the FITT Principle: Selecting exercises and putting together a program

***Design your program to maximize the Fitness Benefits and Minimize your Risk of Injury

--FREQUENCY OF EXERCISE

--For general fitness the ACSM (American College of Sports Medicine) recommends 2-3 days per week for Weight Training

--You should allow yourself at least 1 day of rest between workouts –Examples: (Lift upper body Monday then lower body on Tuesday, or Lift full body on Monday and Thursday)

--INTENSITY OF EXERCISE: AMOUNT OF RESISTANCE

--The amount of weight lifted determines the day your body will adapt and how quickly it will adapt.

--To build strength, Lift at 80% of your maximum capacity. For Endurance, Lift between 40%-60% of your maximum capacity.

--TIME OF EXERCISE: REPETITIONS AND SETS

--To improve your fitness, you need to perform enough repetitions to fatigue your muscles

--A heavy weight and low repetitions builds strength (1-5 reps)

--A light weight and high repetitions builds endurance (15-20 reps)

--General Fitness calls for between 8-12 reps for each exercise.

--A Set is a group of repetitions followed by a rest period.

--There is not a set number of sets for increasing strength

--General Fitness calls for 1 set, but most weight training calls for 3 or more sets of each exercise.

--Rest periods in between each set allows the muscles to work at a high intensity for each set.

--The length of the rest period depends on the amount of resistance

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<tr>
<th>Load and Repetitions Guidelines:</th>
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<td>Goal</td>
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<tr>
<td>Strength</td>
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<td>Hypertrophy</td>
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<td>Endurance</td>
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<tr>
<th>Rest Period Recommendations:</th>
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<tbody>
<tr>
<td>Rest Period</td>
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<td>&lt;1 min</td>
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<td>1-2 min</td>
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<td>2-4 min</td>
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<td>5 min</td>
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TYPE OR MODE OF EXERCISE:

--Complete weight training programs work all of the major muscle groups. This includes, back, shoulders, arms, chest, abdomen, legs, buttocks and calves.

--8-10 exercises are required to work all major muscle groups effectively.

--A balanced program works agonist and antagonist muscles.
  
  -Example: Working out the upper arm, the agonist would be the biceps, antagonist would be the triceps.

--Exercises should work from largest muscle groups to smaller muscle groups.
  
  -Example: Work chest and back before shoulders and arms.

WARM UP AND COOL DOWN:

--You should do a general warm up such as walking or slow jogging

--You should do a specific warm up as well to ready your body for the activity in which you are participating.

--Cool down should consist of a relaxing walk and stretch to help prevent muscle soreness.

MAKING PROGRESS:

--To begin training, choose light weights you can easily do 8-12 repetitions for 1 set.

--Slowly add weight at the beginning of the set if repetitions 10-12 are easy for you in the 3rd set.

--Expect rapid improvements in the first 6-10 weeks of training. Gains will come slower after this time period.
GENERAL FITNESS CONCEPTS

Cardiovascular/respiratory endurance – The ability of body systems to gather, process, and deliver oxygen

Stamina – The ability of body systems to process, deliver, store, and utilize energy

Strength – The ability of a muscular unit, or combination of muscular units, to apply force

Flexibility – The ability to maximize the range of motion at a given joint

Power – The ability of a muscular unit, or combination of muscular units to apply maximum force in minimum time

Speed – The ability to minimize the time cycle of a repeated movement

Coordination – The ability to combine several distinct movement patterns into a singular distinct movement

Agility – The ability to minimize transition time from one movement pattern to another

Balance – The ability to control the placement of the body’s center of gravity in relation to its support base

Accuracy – The ability to control movement in a given direction or at a given intensity

Aerobic Exercise – Using oxygen to break down carbohydrates, fats and proteins for energy

Anaerobic Exercise – Using energy stored in muscles or from the breakdown of carbohydrates without oxygen

Muscle Strength – The ability of a muscle to produce a maximal force

Muscle Endurance – The ability of the muscle to execute repeated contraction

Abduction: Lateral movement away from the body’s midline

Adduction: Medial movement toward the body’s midline

Agonist: A muscle in a state of contraction, opposed by the antagonist

Antagonist: A muscle that can move a joint in opposite of the agonist

Atrophy: Decrease in the size of the muscle fibers

Concentric Contraction: Shortening of the muscles during a contraction

Core Exercise: Recruits one or more large muscles area and involves 2 or more primary joints

Eccentric Contraction: Lengthening of a muscle during contraction

Extension: Straightening the joint resulting in an increase of angle

Flexion: Bending a joint resulting in a decrease of angle

Frequency: Number of training sessions in a given time period

Muscle fiber: A single muscle cell, classified by speed, strength or energy source

Load: Amount of weight being lifted

Hyperplasia: An increase the number of muscle fibers

Hypertrophy: Enlargement of the muscle fibers

Isometric: Static contraction of a muscle

Isotonic: Contraction of a muscle against a natural resistance

Isokinetic: Contraction of a muscle against a constant force at a constant speed

Overload Principle: Muscle growth is a response to a progressive increase in load

Repetitions: Number of times an exercise is performed in one set

Repetition Maximum (1RM): Maximum resistance that can be moved 1 time

Set: Grouping of a number of repetitions followed by a rest period