

Principles of Training

Watch YouTube video: Principles of Exercise [https://youtu.be/KrAB_2Uyjyc]

Watch YouTube video: FITT Principle Exam [https://youtu.be/t-p74_GqTd0]

The Principles of Training

The creation of any long-term physical activity or fitness development plan should be based on a number of key principles to be effective and bring about its desired goals. The principles of training are:

1. Specificity
2. Progressive overload
3. Individual variability
4. Diminishing return
5. Reversibility

1. Specificity

In order for the training that you are doing to be effective it should be specific to the sport or task for which you are training. Different energy systems are used for endurance as opposed to strength. Different muscle fibres are used for running as compared to cycling. Different changes take place in the body in response to the type of training you do. Specific training brings specific results.

2. Progressive Overload

Training must place continuous increasing demands or stresses on the body systems (muscular, nervous, and circulatory) if continued changes are to take place. For the beginner, this means that the stresses of training must exceed the everyday demands of the body. As the body gets used to the new stress it must be activated again to a greater extent. Gradually increasing the demands on the body is what progressive overload is all about. The rate of improvement is related to four factors that can be remembered with the letters FITT – Frequency, Intensity, Time (duration), and Type. See the following page for more information on FITT Principle Guidelines.

3. Individual Variability

People respond differently to the same training. Care must be taken to consider this when training with a partner or in groups. Some of the reasons for this difference in training response are discussed below.

- Heredity: many characteristics are genetically inherited (ex. body type, heart and lung size, muscle fibre composition).
- Maturity: more mature individuals are able to deal with, and respond to more training. Less mature individuals need the energy for growth and development and consequently do not respond as well to training.
- Nutrition: training places new demands on the body, which must be addressed with proper nutrition. As the tissues and organs change they require more protein.
- Rest and sleep: the body makes its necessary changes during sleep. Increased training often demands more rest, and too little rest may lead to fatigue. Exercising too frequently and too intensely hinders the body's ability to recover and adapt. Generally, the harder you train, the more recovery you should allow for.

- Illness or injury: the popular phrase “no pain, no gain” has led to the demise of many training programs. Pain is a signal that your body must pay attention to. It is a signal that something is wrong. Ignoring the signals and working through the pain can often lead to serious injury.
- Motivation: the individual must see the relationship between hard work and results that lead to achieving personal goals. Training is easier when you are doing it for personal reasons (intrinsic) rather than for extrinsic reasons (ex. awards, approval of others).

4. Diminishing Return

This principle suggests that the rate of fitness improvement slows down over time as the level of fitness gets nearer to the person’s genetic potential. It is much easier to see results from a fitness development program when the starting point is relatively low. Extremely fit individuals make only small advances towards a higher fitness level over a significant amount of time. Alternating the form of exercise is sometimes helpful for people with a high fitness level to reactivate change.

The duration of an activity many also fall under this principle. Doing aerobic exercise for longer than one hour, for example, does little enhance the cardiovascular training effect.

5. Reversibility

The adaptations and changes that take place after months of training are reversible. If the body ceases to be stressed, then the adaptations that have been gained will be lost. With complete bed rest, fitness can decline at the rate of 10% per week according to Brian J. Sharkey the author of *Fitness and Health*. In other words, the principle of reversibility means that “if you don’t use it, you’ll lose it”.

FITT Principle Guidelines				
Fitness and/or Health Benefit	Variables			
	F Frequency	I Intensity	T Time	T Type
Cardiovascular endurance (aerobic)	<ul style="list-style-type: none"> 3 to 5 times per week 	<ul style="list-style-type: none"> Moderate to vigorous intensity (60% to 85% of maximum heart rate) 	<ul style="list-style-type: none"> Minimum of 20 minutes 	<ul style="list-style-type: none"> Running Cycling Cross-country skiing (continuous motion f large muscle group[s])
Muscular Strength	<ul style="list-style-type: none"> Alternate days 3 times per week 	<ul style="list-style-type: none"> High resistance (sets to maximum capability) 	<ul style="list-style-type: none"> 1 to 3 sets of 8 to 12 repetitions 	<ul style="list-style-type: none"> Free weights Universal gym Tubing Body weight
Muscular Endurance	<ul style="list-style-type: none"> Alternate days 3 times per week 	<ul style="list-style-type: none"> Low to moderate resistance 	<ul style="list-style-type: none"> 3 sets of 10 to 20 repetitions 	<ul style="list-style-type: none"> Free weights Universal gym Tubing Body weight
Flexibility	<ul style="list-style-type: none"> Daily 	<ul style="list-style-type: none"> Slow and controlled movement 	<ul style="list-style-type: none"> 20 to 30 seconds 	<ul style="list-style-type: none"> Static
Body Composition	<ul style="list-style-type: none"> 5 to 7 times per week 	<ul style="list-style-type: none"> Combination of intensities 	<ul style="list-style-type: none"> Dependent on intensity 	<ul style="list-style-type: none"> Aerobic Anaerobic Resistance
Anaerobic	<ul style="list-style-type: none"> Alternate days 2 or 3 times per week 	<ul style="list-style-type: none"> 90% of maximum heart rate 	<ul style="list-style-type: none"> 2 to 3 minutes per "bout" 	<ul style="list-style-type: none"> Sprinting Jumping
Active Daily Living/Health	<ul style="list-style-type: none"> daily 	<ul style="list-style-type: none"> low to moderate intensity 	<ul style="list-style-type: none"> 30 to 60 minutes 	<ul style="list-style-type: none"> Gardening Walking Bowling

Health-Related Fitness Components

When developing a physical activity or fitness plan it should be balanced and contain exercises that contribute to each of the following components.

Cardiovascular Endurance: the ability of the heart, blood vessels, and lungs to provide the working muscles with adequate oxygen during prolonged activity (also called aerobic endurance or capacity).

Muscular Strength: the amount of force that can be exerted by a muscle or a group of muscles in a single effort. Muscular strength is developed by using resistance exercises and applying the principles of training discussed previously in this lesson. Resistance refers to a force, usually measured in kilograms or pounds, that acts against your muscles. The key to improving strength is to use heavy weight (high resistance) in combination with few repetitions.

Muscular Endurance: the ability of a muscle or group of muscles to exert force over an extended period of time without incurring fatigue. Muscular endurance is important for good posture and for injury prevention. For example, if abdominal and back muscles are not toned enough to hold the spine correctly, the chances of lower-back pain and back injury are increased. Muscular endurance helps people cope with the physical demands of everyday life and enhances performance in sports and work. Muscular endurance is developed by repeating an exercise many times with little or no resistance.

Flexibility: the range and ease of movement of a joint (limited by bone, muscles, ligaments, tendons, and the bone-joint capsule). Flexibility in a joint is also specific to the action performed at the joint. The ability to do front splits does not mean that side splits can be done even though both actions occur at the hip.

Body Composition: the relative percentage of muscle, fat, bone, and other tissue of which the body is composed. The primary concern for physical activity is the amount of lean muscle mass or the amount of muscle compared to the amount of body fat. Keeping the amount of body fat lower and the amount of muscle tissue higher is the goal of many. Body fat contributes no strength advantage and limits endurance, speed, and general movement. Through proper nutrition and daily exercise program most people are able to maintain a desired body composition.

Assignment: Apply Principles of Training

Name: _____

Date: _____

Using the activities suggested indicate how you would apply the principle of training listed.

Principle of Training	Suggested Activity	How to Apply
Specificity	ex. cyclist in terms of their cardiovascular endurance	
Progressive Overload	ex. Olympic weightlifter in terms of their muscular strength	
Individual Variability	ex. father and son training for a marathon in terms of their cardiovascular endurance	
Diminishing Return	ex. world class sprinter trying to decrease their time by 1 second in terms of their muscular strength and flexibility	
Reversibility	ex. a person being bedridden with an injury for one week in terms of their muscular strength, endurance, cardiovascular endurance, and flexibility	