

## **UNIT 3: Principles of Exercise**

**GRADE LEVEL:** 8-12

**TIME RANGE:** No less than 15 days

**GRADING PERIOD:** ANY

### **LESSON/UNIT PLANS**

**UNIT: 3**

**TOTAL LESSONS: 6 out of 15 LESSONS**

#### **OBJECTIVES:**

1. Identify the key components of a complete fitness program;
2. Apply the progressive resistance exercise (PRE) principle to your specific workout;
3. Design formal warm-up and cool down sessions for your exercise program;
4. Identify your target heart rate range and determine whether your exercise program is intense enough to elevate and maintain your heart rate range;
5. Examine your personal exercise program for effectiveness; and
6. Evaluate various exercise programs in terms of their effectiveness in developing aerobic fitness, muscular strength, muscular endurance, and flexibility and in lowering body fat and improving lean body mass.

Students can reach these objectives through the following methods:

1. Complete an awareness inventory that describes, defines and discusses the above objectives.
2. Complete an assessment of your exercise workout behavior
3. Prepare a schedule of your daily routine to include class, study, work, mealtime, church, and other related activities throughout the week and then plug in an available time to commit to exercise.
4. Complete a record of each workout and sign a contract to yourself for your workout plan.

Service-Learning Activity for Principles of Exercise

Conduct a presentation to the class on principles of exercise that will influence others to exercise regularly.

## **LESSON 1:**

Identify the key components of a complete fitness program.

### **LESSON FOCUS:**

Complete an awareness inventory that describes, defines and discusses the above objectives.

### **LESSON PLAN:**

1. As a warm-up conduct a 10-15 minute instant activity that gets the students moving throughout the gym and prepares them for the main physical activity.
2. Have students complete an awareness inventory that describes, defines and discusses the above objectives. See below Awareness Inventory
3. After students complete the wellness inventory share the answers with them and discuss each question with the class.
4. Discuss and explain how the five key components of health-related fitness can be applied to most exercise choices to improve their fitness and should be the Ideal Exercise Program.
  - a. Cardiorespiratory Function
  - b. Muscular Strength
  - c. Muscular Endurance
  - d. Flexibility
  - e. Body Composition
5. After completing the inventory and brief discussion conduct the pacer run with the students again. This is the partner pacer run.
6. Partner Pacer Run: Use the Pacer CD.
  - a. Divide students into groups of 2.
  - b. Partners stand together from front to rear across the start line at the beginning of the Pacer Run.
  - c. The first partner begins the pacer run while their partner stands at the line.
  - d. The first partner completes two lengths of the pacer run returning to stand behind the partner like in a relay.
  - e. The next partner begins the 3<sup>rd</sup> and 4<sup>th</sup> lap and this continues until they no longer can perform any laps correctly.

7. For additional information on the five components of fitness refer to the following Website: <http://www.abc-of-fitness.com/start-fitness-program/components-of-fitness.asp>



## Awareness Inventory

Name \_\_\_\_\_ Date \_\_\_\_\_

Check the space by the letter T for the statements that you think are true and the space by the letter F by the statements that you think are false. The answers appear following the list of statements. This chapter will present information to clarify these statements for you. As you read the chapter, look for explanations for the reasons why the statements are true or false.

- T \_\_\_ F \_\_\_ 1. The single most important component of health-related fitness is aerobic or cardiovascular fitness.
- T \_\_\_ F \_\_\_ 2. Strength training and the addition of muscle mass will increase metabolism and help me control body weight.
- T \_\_\_ F \_\_\_ 3. Previously sedentary individuals who begin an exercise program can easily complete 20 to 30 minutes of continuous exercise at or above their target heart rate in the first workout.
- T \_\_\_ F \_\_\_ 4. The volume of blood pumped by the heart per minute of exercise is referred to as stroke volume.
- T \_\_\_ F \_\_\_ 5. Running or walking 2 miles on each of 2 consecutive days burns more calories than one 4-mile walk or run.
- T \_\_\_ F \_\_\_ 6. Studies show that 70 to 75% of our nation's adult population exercises in a manner that meets the surgeon general's recommendation of three times weekly at the target heart rate for 20 to 30 minutes.
- T \_\_\_ F \_\_\_ 7. Alternating step classes with jogging and swimming is a sound approach to exercise referred to as cross-training.
- T \_\_\_ F \_\_\_ 8. All-out exercise efforts such as a 200-meter dash or 10 to 15 40-yard dashes at 30-second intervals are examples of anaerobic training.
- T \_\_\_ F \_\_\_ 9. The key to body-fat loss through exercise is intensity, not volume; short, highly intense workouts burn more calories than long, sustained efforts.
- T \_\_\_ F \_\_\_ 10. Elderly men and women over the age of 70 should engage in a regular strength-training program (weight training).

**Answers: 1-T, 2-T, 3-F, 4-F, 5-T, 6-F, 7-T, 8-T, 9-F, 10-T**

**LESSON 2:**

Apply the progressive resistance exercise (PRE) principle to your specific workout.

**LESSON FOCUS:**

Complete an assessment of your exercise workout behavior

**LESSON PLAN:**

1. Explain and conduct the pacer test/run as a warm-up to the activity. This should take approximately 15-20 minutes.
2. Have students complete an Analyze Yourself/Assessing Your Exercise Workout Behavior that describes, defines and discusses the above objectives. See below Analyze Yourself.
3. After students complete the assessment share the answers with them and discuss each question with the class.
4. Explain and discuss the preconditioning period. This is a period of several weeks taken to prepare the body gradually for maximum-effort testing or engagement in a vigorous activity or sport, (Pre-season). This is usually 2-3 weeks of your new program which you progress slowly and enjoy each workout session (early stages of your program).
5. Explain and discuss the Progressive Resistance Exercise (PRE) Principle. This is a process that gradually overloads one of the body's systems (muscular, circulatory, or respiratory), it will develop additional capacity. When you repeatedly perform more strenuous exercise, the body repairs itself through elaborate cellular changes to prepare for more challenging exercise demands.
6. Set-up 6-10 circuit training stations that will get students into their training heart rate zone. Provide music that is a fast beat to motivate the students and it is recommended that students can bring in their own music if it is clean and free of inappropriate content. How to use the above PRE instead of the usual duration at each station that you have done in the past (i.e., 20-30 seconds at each station) make the station longer for 30-40 seconds before rotating to the next station.
7. The circuit training activity should last from 20-30 mins.

8. For additional information on PRE refer to the following website:  
<http://www.sportsci.org/encyc/adaptex/adaptex.html>



## Analyze Yourself

### Assessing Your Exercise Workout Behavior

Name \_\_\_\_\_ Date \_\_\_\_\_

*Instructions:* Indicate how often each of the following occurs in your daily activities and exercise sessions. Respond to each item with a number from 0 to 3, using the following scale:

0 = Never   1 = Occasionally   2 = Most of the time   3 = Always

- \_\_\_ 1. I use a general warm-up that produces perspiration, followed by a stretching session before beginning the workout.
- \_\_\_ 2. I engage in aerobic exercise and complete 20 to 30 minutes of continuous, uninterrupted activity or total 60 minutes of activity by the end of the day three to four times each week.
- \_\_\_ 3. I engage in a strength-training (weight-training) program at least three times weekly.
- \_\_\_ 4. To avoid repetitive motion injuries, I use two or more different types of aerobic exercise each week such as jogging, step, cycling, and swimming.
- \_\_\_ 5. Each workout includes a cool-down period that tapers off to allow my body to return slowly to its resting state.
- \_\_\_ 6. I follow the progressive resistance principle in my workouts and keep records to make sure I do more work each training session.
- \_\_\_ 7. I take my pulse during or immediately after activity and know that I am in my target heart rate zone throughout the aerobic workout.
- \_\_\_ 8. I am careful to alternate light and heavy workouts in my exercise program.
- \_\_\_ 9. I exercise on soft surfaces such as grass, synthetic track, or mats whenever possible.
- \_\_\_ 10. I keep some records weekly to monitor my progress, frequency of exercise, fatigue level, and injuries.

**Scoring:**      Excellent = 25-30  
                      Good = 19-24  
                      Poor = Below 19



### **LESSON 3:**

Design formal warm-up and cool down sessions for your exercise program;

### **LESSON FOCUS:**

Complete an assessment of your exercise workout behavior

### **LESSON PLAN:**

1. Prior to the start of the activity a proper warm-up should take place.
2. Explain to the students the below:

#### Warm Up

Muscle stiffness is thought to be directly related to muscle injury and therefore the warm up should be aimed at reducing muscle stiffness.

Warming up should at least consist of the following:

- 5 to 10 minutes jogging - to increase body temperature
- 10 to 15 minutes dynamic stretching exercises - reduce muscle stiffness
- 10 to 15 minutes general and event specific drills - preparation for the session or competition. e.g. for a runner
- 4 to 8 easy run outs over 30 to 60 meters - focus on correct running technique (Tall, Relaxed, Smooth and Drive)

Dynamic stretches are more appropriate to the warm up as they help reduce muscle stiffness. Static stretching exercises do not reduce muscle stiffness.

What are the benefits of a warm up?

Performance may be improved, as an appropriate warm up will result in an:

- Increased speed of contraction and relaxation of warmed muscles
- Dynamic exercises reduce muscle stiffness
- Greater economy of movement because of lowered viscous resistance within warmed muscles
- Facilitated oxygen utilization by warmed muscles because haemoglobin releases oxygen more readily at higher muscle temperatures

- Facilitated nerve transmission and muscle metabolism at higher temperatures; a specific warm up can facilitate motor unit recruitment required in subsequent all out activity
- Increased blood flow through active tissues as local vascular beds dilate, increasing metabolism and muscle temperatures
- Allows the heart rate get to a workable rate for beginning exercise
- Mentally focused on the training or competition

## Cool Down

Cooling down should consist of the following:

- 5 to 10 minutes jogging/walking - decrease body temperature and remove waste products from the working muscles
- 5 to 10 minutes static stretching exercises

Static stretches are more appropriate to the cool down as they help muscles to relax, realign muscle fibres and re-establish their normal range of movement. These stretches should be held for approximately 10 seconds.

What are the benefits of a cool down?

An appropriate cool down will:

- aid in the dissipation of waste products - including lactic acid
- reduce the potential for DOMS
- reduce the chances of dizziness or fainting caused by the pooling of venous blood at the extremities
- reduce the level of adrenaline in the blood
- allows the heart rate to return to its resting rate

3. For additional information on warm-up and cool downs refer to the following website: <http://www.brianmac.co.uk/warmup.htm>
4. After discussing with the students the proper warm-up and cool down, set-up an instant activity that provides all the components of a warm-up.
5. After the warm-up conduct your main activity session and follow-up with a proper cool-down.

## LESSON 4:

Identify your target heart rate range and determine whether your exercise program is intense enough to elevate and maintain your heart rate range.

## LESSON FOCUS:

Identify your target heart rate range.

## LESSON PLAN:

1. After conducting an Instant activity/warm-up explain to the students that they will now identify their target heart rate range/zone for physical activity.
2. Below is additional information with the following website address:

<http://www.thewalkingsite.com/thr.html>

## YOUR TARGET HEART RATE

**You should know your Maximum Heart Rate and your correct training zone** to know if you are training at the right pace. Here are a few ways to figure your target heart rate.

You can easily find your Target Heart Rate (thr) with this simple method. Subtract your age from 220 (226 for women) to calculate your Maximum Heart Rate (mhr). Find your *training zone* below and multiply that number times your maximum rate.

Another, more accurate method is the [Karvonen Formula](#). You must know your *resting heart rate* to use this method and insert your *training zone* from below.

Of course the most accurate method is a treadmill stress test administered by a professional. If you are over the age of 35, overweight, have been sedentary for several years, or have a history of heart disease in your family, clinical testing is recommended.

## MEASURING YOUR HEART RATE

Wearing a heart rate monitor is an easy, accurate method of checking your heart rate... but you don't have a monitor. Here is another easy way.

The easiest place to feel your own heart beat is the carotid artery. Place your index finger on the side of your neck between the middle of your collar bone and your jaw line. (You may also use the radial artery on the under side of your wrist.) You can count the beats for a full 60 seconds or count for 6 seconds and add a zero at the end. If you felt your heart beat 14 times in 6 seconds the number would be 140 for a full 60 seconds. Counting for only six seconds is a convenient method, of course it is more accurate to count for the full 60 seconds. You can use several varieties of this method (30 seconds x 2, 15 seconds x 4, etc.). The longer you count the more accurate your reading. Whatever you choose, be consistent in your method.

## **TRAINING ZONES**

**Healthy Heart Zone (Warm up)** --- 50 - 60% of maximum heart rate: The easiest zone and probably the best zone for people just starting a fitness program. It can also be used as a warm up for more serious walkers. This zone has been shown to help decrease body fat, blood pressure and cholesterol. It also decreases the risk of degenerative diseases and has a low risk of injury. 85% of calories burned in this zone are fats!

**Fitness Zone (Fat Burning)** --- 60 - 70% of maximum heart rate: This zone provides the same benefits as the healthy heart zone, but is more intense and burns more total calories. The percent of fat calories is still 85%.

**Aerobic Zone (Endurance Training)** --- 70 - 80% of maximum heart rate: The aerobic zone will improve your cardiovascular and respiratory system AND increase the size and strength of your heart. This is the preferred zone if you are training for an endurance event. More calories are burned with 50% from fat.

**Anaerobic Zone (Performance Training)** --- 80 - 90% of maximum heart rate: Benefits of this zone include an improved VO2 maximum (the highest amount of oxygen one can consume during exercise) and thus an improved cardiorespiratory system, and a higher lactate tolerance ability which means your endurance will improve and you'll be able to fight fatigue better. This is a high intensity zone burning more calories, 15 % from fat.

**Red Line (Maximum Effort)** --- 90 - 100% of maximum heart rate: Although this zone burns the highest number of calories, it is very intense. Most

people can only stay in this zone for short periods. You should only train in this zone if you are in very good shape and have been cleared by a physician to do so.

3. After explaining to students have them calculate their training heart rate zones on the below form:



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## Discovery Activity 3.2

### Finding Your Target Heart Rate

Name \_\_\_\_\_ Date \_\_\_\_\_

*Instructions:* The target heart rate (THR) is the range of heart rate that will produce training effects on the heart if it is maintained for a sufficient length of time (usually 20 to 30 minutes) at least three times per week. This kind of exercise is commonly known as aerobic exercise. The purpose of this lab is to determine your THR, or exercise benefit zone (EBZ).

1. Determine your resting heart rate (RHR)—the lowest heart rate you experience anytime during your waking hours, day or evening. Check it several times during the day when you feel relaxed. (Refer to steps 1 and 2 of Discovery Activity 2.2 on page 52 for specific instructions on finding your RHR.)
2. Use the following formula to compute your 60%, 70%, and 85% target heart rates. You should stay in this zone during aerobic exercise.

60% THR

220 - \_\_\_\_\_ (subtract age) - \_\_\_\_\_ (subtract RHR)  $\times$  .60 + \_\_\_\_\_ (add RHR) = \_\_\_\_\_

70% THR

220 - \_\_\_\_\_ (subtract age) - \_\_\_\_\_ (subtract RHR)  $\times$  .70 + \_\_\_\_\_ (add RHR) = \_\_\_\_\_

85% THR

220 - \_\_\_\_\_ (subtract age) - \_\_\_\_\_ (subtract RHR)  $\times$  .85 + \_\_\_\_\_ (add RHR) = \_\_\_\_\_

From *Physical fitness and wellness, third edition*, by Jerrold S. Greenberg, George B. Dintiman, and Barbee Myers Oakes, 2004, Champaign, IL: Human Kinetics.

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4. Conduct the main activity session while focusing on getting the students in their target heart rate range/zone.

**LESSON 5:**

Examine your personal exercise program for effectiveness.

**LESSON FOCUS:**

1. Prepare a schedule of your daily routine to include class, study, work, mealtime, church, and other related activities throughout the week and then plug in an available time to commit to exercise.

**LESSON PLAN:**

1. Conduct an instant activity/warm-up for the class based on the previous lessons of a proper warm-up.
2. Distribute and explain Discovery Activity 3.1/Choosing and Committing to an Exercise Program.
3. This exercise will assist students in identifying specific times, dates, and places to exercise in activities that they enjoy that also produce significant health benefits.
4. Have students determine the best time and days for them to exercise.
5. After the students complete the 3.1 activity conduct a physical activity that promotes a cardiorespiratory workout and proper cool down.



## Discovery Activity 3.1

### Choosing and Committing to an Exercise Program

Name \_\_\_\_\_ Date \_\_\_\_\_

*Instructions:* This lab will assist you in identifying specific times, dates, and places to exercise in activities you enjoy that also produce significant health benefits.

1. Determine the best time and days for you to exercise. Prepare a schedule of your daily routine Monday through Sunday. Include your class, study, work, mealtime, church, and other activities.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
7-8							
8-9							
9-10							
10-11							
11-12							
12-1							
1-2							
2-3							
3-4							
4-5							
5-6							
6-7							
7-8							
8-9							
9-10							

Now choose a block of time (at least 1 hour, ideally 1 1/2 hours) on 3 separate days, avoiding 2 days in succession. You may want to exercise early in the morning (which has been shown to boost metabolic and energy levels), keep exercise as a reward at the end of the day, or take advantage of a lull between classes to break up your day. Whatever your choice, force yourself to adhere to the schedule for at least a month.

Weekly exercise days and time \_\_\_\_\_

### **Discovery Activity 3.1** *(continued)*

2. List the three most important outcomes you expect from your exercise program.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_

3. Determine the type of exercise you are most likely to enjoy. Review table 3.1 and select several activities you can try in your newly chosen exercise time slot that develop a moderate to high level of cardiorespiratory fitness. You may want to use the sports approach and play tennis, handball, racquetball, squash, badminton, basketball, soccer, or some other sport that is convenient and enjoyable for you, or you might prefer to take an aerobic approach and join an exercise class, walk, cycle, or swim. Each of these activities and many others can provide significant health benefits over time. Try several activities until you discover a cardiorespiratory workout that you really enjoy. If your schedule allows, consider using two weight-training workout sessions per week for 20 to 30 minutes following your cardiorespiratory exercise. Go to the university weight room and ask for help in setting up a program that meets your needs. Make certain that your exercise choices are capable of producing the desired outcomes you identified in step 2.

4. Keep a record of each workout using a form like the one in figure 3.2. By monitoring your progress and recording your feelings, you are more likely to avoid overuse and other injuries and remain motivated enough to stay with your program. After a month, you should begin to feel better and have more energy.

5. Sign the exercise contract on page 82 to confirm your commitment to a month of regular exercise 3 to 4 days per week.



**LESSON 6:**

1. Evaluate various exercise programs in terms of their effectiveness in developing aerobic fitness, muscular strength, muscular endurance, and flexibility and in lowering body fat and improving lean body mass.
2. Complete a record of each workout and sign a contract to yourself for your workout plan.

**LESSON FOCUS:**

Service-Learning Activity for Principles of Exercise

Conduct a presentation to the class on principles of exercise that will influence others to exercise regularly.

**LESSON PLAN:**

1. Conduct an instant activity/warm-up for the class based on the previous lessons of a proper warm-up.
2. Distribute and explain Contract to Increase My Physical Activity Level.
3. After students complete their contract, have them select a partner and share explain and share their contract with partner. Both partners become the witness for each other and sign-off on each other's contract.
4. After the students complete the Contract conduct a physical activity that promotes a cardiorespiratory workout and proper cool down.
5. Explain the Service-Learning Activity for Principles of Exercise.

Students will conduct a presentation to the class on their personal principles of exercise that will influence others to exercise regularly. This is a 10 minute presentation that can be completed through a PowerPoint or digital video presentation to the entire class. It can also be completed with one another partner from their class.

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## Contract to Increase My Physical Activity Level

During the next 4 weeks, from \_\_\_\_\_ to \_\_\_\_\_, I hereby agree to work as hard as possible at achieving the following:

1. Physical activity goals for increasing my energy use during occupational time:
  - a. I will park my car or leave public transportation and walk \_\_\_\_ additional minutes per day.
  - b. I will spend \_\_\_\_ minutes daily standing instead of sitting while I work.
  - c. I will walk up \_\_\_\_ flights of stairs each working day.
  - d. I will walk around my work area \_\_\_\_ minutes every day.
  - e. I will spend \_\_\_\_ minutes during each coffee break standing instead of sitting.
  - f. I will spend \_\_\_\_ minutes during each lunch break walking outdoors.
2. Physical activity goals for increasing my energy use during recreational time:
  - a. I will spend \_\_\_\_ minutes daily doing stretching activities to increase my flexibility.
  - b. I will spend \_\_\_\_ minutes at least three times per week doing aerobic activities to improve my endurance.
  - c. I will spend \_\_\_\_ minutes at least three times per week doing strength activities.
  - d. I will spend \_\_\_\_ minutes Saturday and Sunday in active recreational activities.
3. I agree to do one of the following as my reward when I achieve my daily goals in increased activity:
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
  - d. \_\_\_\_\_
  - e. \_\_\_\_\_
  - f. \_\_\_\_\_
4. I agree to do one of the following as my consequence when I do not achieve my daily goals:
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
5. I will reward myself every week with one of the following when I achieve my weekly exercise goals:
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
  - d. \_\_\_\_\_
  - e. \_\_\_\_\_
  - f. \_\_\_\_\_
6. When I do not achieve my weekly goals, I agree to do the following:
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_

I agree to follow this contract until I reach my goals.

Signed \_\_\_\_\_ Date \_\_\_\_\_

Witnessed \_\_\_\_\_

