6th Grade Fitness
Cardiovascular Endurance and Flexibility

Improving or maintaining health should be a primary goal of any exercise program. Why? There is a growing body of evidence that shows the sedentary life-style is causing major deterioration in normal body functions. Osteoporosis, **hypertension**, **obesity,** and mental health are a few of the problems that can occur because of physical inactivity

Fitness is the condition in which an individual has sufficient energy to avoid fatigue and enjoy a happy, healthy life. It is the capacity of the lungs and muscles to function at optimum efficiency. Wellness (quality of life) in an individual is determined by the interaction of that person's physical, emotional, interpersonal, social, and spiritual health.

Physical fitness can be divided into two types of components:
Health-related and skill related.

Health related fitness components promote optimum health and prevent the onset of disease and problems associated with inactivity. They are cardio respiratory (aerobic fitness), muscular strength, muscular endurance, flexibility, and body composition.

Skill-related fitness includes balance, agility, coordination, power, reaction time, and speed.

Cardio respiratory Fitness – is the ability of the heart, blood vessels, blood, and lungs to supply oxygen and remove their waste products of the working muscles for an extended period of time. Also known as aerobic fitness, it is the ability of the circulatory and respiratory system to adjust to and recover from the effects of moderate to vigorous activity.

There are four techniques that can be used to improve cardiovascular endurance:

a. continuous activity
b. interval
c. fartlek
d. circuit course activity.

Continuous can be aerobic or anaerobic activities. Aerobic means "with oxygen" and are activities that of a moderate intensity and can be sustained over a period of time. Walking, running, biking, or swimming are a few examples. Anaerobic activities are short blasts of activity that are done in the "absence or oxygen" like running the 100 meter dash or swimming laps for time.

Interval activities are ones that alternate in intensity, like relay races.

Fartlek are just like intervals but the terrain you are running controls the intensity.

Circuit training combines continuous activity with flexibility and muscular strength/endurance for variety.

Muscular Strength is the greatest force that can be produced by a muscle or group of muscles to lift a maximum weight. Dynamic strength is the force exerted by a muscle group as the body moves (like push ups). Static strength is the force exerted against an immovable object (like pushing against a wall). Continuous movement with added weight will develop strength.

Muscular Endurance is the ability to contract a muscle or muscles repeatedly without getting tired. Locomotor movements help develop muscular endurance. Continuous movement with very little resistance (no weight) will develop endurance.

Flexibility is the ability of a joint to move freely in every direction or through a full range of motion. This can be improved with stretching. Two types of stretching are static and ballistic. Static stretching involves slow, gradual and controlled elongation through a full range of motion. Ballistic stretching is rapid, uncontrolled, and bobbing or bouncing motion and is not recommended because of the higher risk of injury.

Body Composition is the quality or makeup of the total body mass. Total body mass is composed of lean body mass (bones, water, organs, and muscles), and fat mass (adipose tissue).

Benefits of Exercise

1. Makes the heart pump more strongly.
2. Increases efficiency of the lungs.
3. Helps lower blood pressure and resting heart rates
4. Reduces the risks of heart disease
5. Strengthens the bones and muscles
6. Gives you more energy to do school work, daily chores, and play
7. Helps maintain a healthy body weight, and Reduces stress.
8. Improves confidence and self-esteem

Fitt Principles for Exercise Workout

Many training programs follow the FITT principles for improving and maintaining one's physical fitness.

1. (F) frequency = HOW OFTEN. Number of times a person is involved in physical activity that is moderate to vigorous in nature. According to the U.S. SURGEONS GENERAL REPORT ON PHYSICAL ACTIVITY AND HEALTH, should be done most days of the week but no less than three times.

2. Intensity= HOW HARD. Speed or workload used in the given exercise period. Aerobic intensity is measured by heart rate. The workload or resistance of the exercise determines strength and endurance. Flexibility is the range of motion a joint can achieve.

3. Time= HOW LONG. Number of minutes of physical activity. Middle school/20 to 35 minutes. High school/30 to 45 minutes. It is how many repetitions or set a person performs in strength and endurance
4. Type= What kind of exercise. (i.e. Aerobic, anaerobic, strength, or endurance)

The Five Heart Zones 

There are five different heart zones that are each 10% of an individual's personal maximum heart rate (MHR). Students train in different zones on different days to accomplish their fitness goals. Each of the different heart zones has its own unique nature.

The Z1 Healthy Heart Zone

Being the easiest, most comfortable intensity range – 50 to 60 % MHR – the "Healthy Heart" as opposed to sedentary heart rate. **There is noticeable improvement in several other wellness categories: the blood pressure lowers, cholesterol levels improve, body fat decreases or stabilizes, and muscle mass increases**.

If you walk two miles a day for 30 minutes, three times a week, and death from all-cause morbidity is re-duced by 55%, according to Ken Cooper, MD.

The zone floor for the Healthy Heart zone is 50 percent of your MHR. When you cross this floor, you will realize health benefits. The amount of energy burned during this time will not be as great as in higher zones, but you will be burning a relatively large percentage of the type of calories that are most preferred as your source of fuel-fat. **In the Healthy Heart zone, while the total calories burned per workout may be low, a very large percentage of the calories are fat calories**.

Fuel Usage: Healthy Heart Z1

Zone	Zone Name	% MHR	Fuels Burned
Z1	Healthy Heart	50-60%	60-85% Fat

The Z2 Temperate Zone

The "Z2 Temperate" zone is called this because it is a moderate and comfortable zone. As in the Healthy Heart zone, approximately 70-85% of all of the calories that are burned in the Z2 zone come from fat.

Fuel Usage: Temperate Z2

Zone	Zone Name	% MHR	Fuels Burned
Z2	Temperate	60-70 %	85% Fat

When you exercise in the Temperate zone, your health rewards are doubled because you dispose of more body fat and, at the same time, gain muscle mass. Consequently, there is more muscle available to burn fat and the resting metabolic rate increases more. In other words, the more muscle mass you have, the more calories you'll burn just sitting still.

The Z3 Aerobic Zone

In the "Aerobic" zone you'll get the most benefits in the least amount of time. It gets you fitter, gets you faster, and gets you thinner. It is the guts of the target heart rate zone.

Fuel Usage: Aerobic Z3

Zone	Zone Name	% MHR	Fuels Burned
Z3	Aerobic	70-80 %	60 % Carbohydrates 35 % Fat

The Aerobic zone is the fitness area at the heart of the wellness field. It is the transition zone between the two health zones and the two performance zones. It's also the first of the zones in which performance training effects begin. In the Aerobic zone you begin to realize the changes that lead to athletic conditioning versus basic health and fitness. These benefits include:

- **An increase in the number and size of blood vessels resulting in,**
  - **Increased blood delivery to your muscles,**
  - **Increased oxygen delivery to the muscles for fuel,**
  - **Increased oxygen delivery to the fat cells to free them into the blood,**
  - **Increased blood to carry the fat from fat cells to the muscles,**
  - **Increased number of capillaries in the working muscles,,**
  - **Increased size of coronary arteries, and**
  - **Reduction in blood pressure**
- **An increase in both the size and strength of the heart, resulting in**
  - **Increased cardiac output (stroke volume times heart rate), and**
  - **Decreased heart rate for the same intensity level workload**
- **Increased vital capacity (the amount of air that can be breathed out after a maximal intake of breath)**
- **Decreased respiratory rate (the number of breaths you take in response to a given level of workload)**
  - **Increased stroke volume(the amount of blood pumped with each heartbeat),**

Calculating Heart Rate Zones

Resting heart rate (RHR) – lowest heart rate usually found in morning before getting out of bed) should be about 70 to 100 beats per minute. Blood pumped through the heart and other organs would be about 4 liters. During strenuous exercise the heart and other muscles can receive about 16 liters of blood in a minute. An average person breathes about 12-15 times a minute, moving about 5 liters of air. During exercise the breathing rate may triple and the amount of air taken into the lungs may increase more than 5 times.

To figure your exercise zone:

1. Subtract your age from 220. This will give you your maximum heart rate. You should not exceed this rate for prolonged periods of time. It would put too much stress and might cause damage to the heart instead of strengthening it.

2. Multiply the maximum heart rate by the zone you intend to work in. That would give you the low and high heart rates you should maintain during your exercise activity periods.

50 to 60% HR max = Healthy Heart Rate Zone bpm_____to _____
60 to 70% HR max = Temperate zone bpm_____to _____
70 to 80 % HR max = Aerobic Zone bpm_____to _____

3. THRZ (Target heart rate zone) = the low to high beats per minute an individual will work out at to get any benefit from exercise work out. Zone crosses several heart rate zones. 65 to 85%

How to monitor heart rate (bpm = beats per minutes)
Pulse (contraction and expansion of the arteries as blood passes through them) can be monitored by manual methods or monitors.

Manual:

a. Put first two fingers on the CAROTID ARTERY in the neck on either side of the Adam's apple.
b. Put first two fingers on the RADIAL ARTERY in the wrist (THUMB SIDE)
c. Put hand over heart.

Once the pulse is located count the number of times the pulse is felt. Count for 6 seconds and multiply that number by 10. This will be beat per minute (BPM)

Heart Rate Monitors
To begin activity:

1. Put on transmitter band below the pectoral muscles and across the sternum. Make sure the band is making direct contact with skin. Electrodes need to be moist.
2. From the time of day mode, press the red button once to bring up the Stand by screen. In the lower left hand corner a small heart will begin to flash and with in 15 seconds your heart rate will appear on the lower line.
3. To start the stopwatch (heart rate will only be recorded if the stop watch is running) press the red button once more. The middle line will show the elapsed exercise time.
4. The upper row is labeled "TZ". This line will show the accumulated time that you stay in your target heart rate zone
5. When ever you are above or below your target heart rate zone the watch will beep and the heart rate display will flash.
6. Work until you complete the duration of the workout for that day,

7. Stop the watch by pushing the Blue button on the lower left side of the watch. This will take you to the time of day.

To Read Data:

1. From the time of day, press the upper right hand button one time. The screen should read "file".
2. Enter this mode by pressing the red button one time. The amount of time spent in the target zone will be in the middle row and the average heart rate for the entire exercise will be at the bottom.
3. Press the upper right button one time. The time spent above the target rate zone will be displayed.
4. Press the upper right button one time. The time spent below the target zone will be displayed.
5. Press and hold the blue button in the lower left hand side to return to the time of day
6. Return the watch and transmitter band to the correct place in the box and the transmitter band to the correct plastic box.

Recovery Heart Rate is how long it takes for your heart to get back to its resting heart rate after exercise.

Pedometer/step Counter

How to set the counter:

1. To open the counter – grasp the top of the clip with one hand and use the other hand to push the door away from the clip.
2. To clear the data that has been record previously, push the reset button
3. To set your pace –push the mode button until the cursor at the top of the screen points to DIS
4. Press the SET button and the Cursor will "jump" to STRIDE
5. Continue to press the SET button until your stride length appears.
6. Press MODE until it returns to STEP

How to Set Your Weight

1. Press MODE until the cursor points to CALORIE.
2. Press SE. The cursor will "jump" to weight.
3. Continue to press SET until you weight appears. (Weight can be from 70 to 300 pounds)

MAKE SURE THE LID IS SNAPPED CLOSED OTHERWISE THE COUNTER WILL NOT WORK!

Exercise workouts

1. Always begin with a warm-up. The activity is designed to increase the muscle elasticity; increases respiration, heart rate, and internal temperature that improve the blood and oxygen flow to working muscles. It should include: 5 minutes of light aerobic activity followed by stretching of all the major muscle groups.
2. Always end with a cool down. This activity allows the blood to continue to pick up waste materials, and avoids blood from pooling in the lower extremities, which prevents dizziness.

Vocabulary:

1. **Aerobic-** long duration, low intensity activities where the body can function at the cell level with enough oxygen (jog, swim, hike, dance, bike) (Temperate to Aerobic Zones)
2. **Aerobic Heart Rate Zone-** third of the zones that you get the most benefits in the least amount of time.
3. **Ambient heart rate-** is when the body is awake but has been sedentary for longer than 3 minutes
4. **Anaerobic –** short intense bursts of activity where the body must function at the cell level without enough oxygen (100 meter dash, swim laps for speed) (Threshold zone)
5. **Aorta –** major artery that leaves the left ventricle containing oxygenated blood
6. **Atrium –** two small top chambers of the heart where veins dump blood from the body (right chamber is larger than left but wall are not a s thick)
7. **Arteries –** elastic tubes that take blood (with nutrients and oxygen) from the heart to all parts of the body
8. **Body Composition-** is the quality or make up of your total body mass (bones, water, organs, and muscles plus at mass. It is determined by your weight relative to your. Height and is influenced by genetics, diet, and lifestyle)
9. **Capillaries –** tiny tubes with very thin walls that connect the arteries to the veins. Here is where the blood exchanges nutrients and oxygen or carbon dioxide and waste products with the body cells.
10. **Cardiovascular fitness**, it is the ability of the circulatory and respiratory system to adjust to and recover from the effects of moderate to vigorous activity
11. **Carotid artery** - artery in the neck just below the ear to take the pulse manually
12. **Circulatory System-** body system that has to do with transporting oxygen, and nutrients, plus carbon dioxide and waste material throughout the body at the cellular level through the blood. Heart, arteries, veins and capillaries comprise this system
13. **Diabetes-** metabolic disorder resulting in the inability of the body to metabolize carbohydrates and control blood sugar levels because the normal insulin mechanism is ineffective
14. **Fitness-** is the condition in which an individual has sufficient energy to avoid fatigue and enjoy a happy, healthy lifestyle.
15. **FITT principle-** training principles for workout sessions
16. **Flexibility-** is the ability of a joint to move freely in every direction or through a full range of motion
17. **Frequency-** part of the Fitt principle of exercise. To gain any benefit from exercise one must do the workouts on a regular basis. **How often will you exercise?**
18. **Heart –** an involuntary muscle that is part of the circulatory system
19. **Heart disease –** stroke, heart attacks, hypertension, arteriosclerosis
20. **Health related fitness components-** promote optimum health and prevent the onset of disease and strength, muscular endurance, flexibility, and body composition
21. **Healthy heart rate zone-** first heart rate zones which is easy and comfortable. A noticeable improvement occurs in the body. The blood pressure lowers, cholesterol levels improve, body fat decreases or stabilizes, and muscle mass increases.
22. **Hypertension** – a condition where a person's blood pressure is continuously abnormally high

23. **Intensity-** part of the FITT principle of exercise. To gain any benefits from exercise one must change the amount of work being done (overload) to improve benefits gained. **How hard will you exercise?**
24. **Muscular Strength-** is the ability of a muscle group to exert maximum force against a given resistance
25. **Muscular Endurance-** is the ability of the skeletal muscles to contract repeated over a period of time
26. **Maximum Heart Rate-** is the maximum number of times a heart can contract in one minute
27. **Mode button-** puts the pedometer in a specific window to perform a specific function
28. **Obesity-** extremely overweight (much more fat tissue than lean muscle mass). Contributes to diabetes and heart disease.
29. **Pedometer-** device use to measure the amount of steps or distance an individual takes in one physical activity session
30. **Pulse- (**contraction and expansion of the arteries as blood passes through them) can be monitored by manual methods or monitors.
31. **Pulmonary artery-** artery that leaves the right ventricle to drop off blood with carbon dioxide to exchange for oxygenated blood
32. **Pulmonary vein-** vein that leaves the left ventricle to carry oxygenated blood through out the body
33. **Resting Heart Rate-** is the heart rate that one has before getting out of bed.
34. **Recovery Heart Rate-** measures the heart's ability to return to normal after exercise
35. **Septum-** wall of muscles that separate the right and left chambers in the heart and the blood from the veins and the arteries
36. **Stride length-** distance person covers per step
37. **Target heart rate zone** The low to high beats per minute an individual will work out at to get any benefit from an exercise work out.
38. **Temperate heart rate zone-** second of the heart rate zones which moderate and rewards experienced in the Healthy zone are doubles. More fat is burned because resting metabolic rate increases.
39. **Time-** length of time the participant stays with activity. **How Long?**
40. **Type-** what kind of exercises will you do (aerobic, anaerobic, strength, or endurance or flexibility)
41. **Valves-** located between the heart chamber and in the veins to prevent backflow of blood
42. **Veins-** less elastic tubes that take the blood from all over the body back to the heart with carbon dioxide and waste material. Have values thorough to prevent the blood from traveling backward as heart beats.
43. **Ventricles-** two lower thick wall chambers that pump blood from the heart. Right takes blood to lungs. Left sends blood through aorta to whole body
44. **Wellness-** (quality of life) in an individual is determined by the interaction of that person's physical, emotional, interpersonal, social, and spiritual health