

## BACKGROUND INFORMATION

### FITNESS PLANNING



#### Background Information

#### Understanding Physical Fitness

*Physical fitness*, in general terms, is a person's ability to meet the physical stresses and demands of a variety of physical activities efficiently and effectively. Physical fitness provides a person with the capacity to perform work safely in activities of daily living, including activities required for work at home and in the workplace, for leisure-time pursuits, and for sports.

The physical stresses and demands of daily living range, for example, from sitting, eating, standing, showering, and walking to the extreme physical demands of shovelling after a major snowstorm, marathon running, participating in a triathlon, and firefighting. Each of these activities requires varying degrees of cardiorespiratory endurance (CRE), muscular strength, muscular endurance, and flexibility to perform it well. Fortunately, the physical demands of showering or walking are not great, making it quite easy for most of us to engage in these physical activities. For a small percentage of the population these activities pose difficulty. Many people are faced with demanding tasks, such as lifting/carrying heavy objects, building, and snow shovelling, which can over-stress the body if it does not have an adequate level of physical fitness. Adequate preparation for these periodic tasks is essential to help minimize the risks of heart attack, stroke, and back injury.

On the other end of the physical activity continuum are the occupations and activities that fall outside the realm of possibility for most of us. These activities require physical fitness levels and skills that are beyond our contemplation or aspiration. They are performed by people who have been genetically gifted and have worked and trained for years to perform at the extreme levels required for these physical activities.

#### Information

#### Definitions of Physical Fitness

While many sources provide definitions of physical fitness (see sample definitions to the right), there is no universally agreed upon definition of physical fitness and of its components. Instructors are encouraged to use definitions from their own sources.

Physical fitness involves the integrated and efficient performance of all the major systems of the body, including the heart and lungs, the skeleton, the muscles, and the brain. The brain is an essential element, as it learns to control the muscles that move the bones, as well as controlling the heart and lungs to provide energy for the working muscles. Fitness also influences our psychological well-being, including mental alertness and emotional stability, because what we do with our bodies also affects our minds.

Physical fitness is an individual condition that varies from person to person. It is influenced by factors such as age, gender, heredity, personal health habits, amount and level of exercise, and eating practices. Making physical fitness a priority is important for a long and healthy life.

### *Health-Related Fitness Components*

Health-related fitness components not only help the body to perform more efficiently, but also help prevent disease and improve overall health and well-being. Manitoba's combined physical education/health education curriculum emphasizes the health-related components of fitness – that is, the physical and physiological components of fitness that have a direct impact on health status.

#### DEFINITION

##### **health-related fitness**

"The state of physical and physiological characteristics that define the risk levels for the premature development of diseases or morbid conditions presenting a relationship with a sedentary mode of life" (Bouchard and Shephard).

The five health-related physical fitness components are cardiorespiratory endurance, muscular strength, muscular endurance, flexibility, and body composition:

- **Cardiorespiratory endurance (CRE)** is the ability of the cardiovascular system (heart, blood, blood vessels) and respiratory system (lungs, air passages) to deliver oxygen and other nutrients to the working muscles and to remove wastes. Tests that involve running (e.g., 20 m shuttle run test), cycling, and swimming can be used to measure this fitness component. *Aerobic power* (maximal oxygen consumption) and *aerobic capacity* are terms used to describe CRE fitness.

Activities vary in intensity level:

- **Light activities** are physical activities that involve large muscle groups. While engaging in light activities, people begin to notice their breathing, but they can still talk fairly easily.
- **Moderate activities** are physical activities that cause breathing and heart rate to increase. People engaging in moderate activities can hear themselves breathe, but they can still talk.
- **Vigorous activities** are physical activities that cause breathing and heart rate to increase to a higher level, making it difficult to talk.

Note that an individual may be working at the moderate to vigorous intensity level while engaging in **muscular strength** activities and **muscular endurance** activities if performed in a circuit format.

- **Muscular strength** is the ability of a muscle, or a group of muscles, to exert force for a brief period of time. Strength of different muscles can be measured by having a person perform weightlifting exercises and determining the maximum amount of weight the person can lift. A person's strength can be expressed as *absolute strength* (the actual weight lifted) or as *relative strength* (the weight lifted, divided by the person's body weight).

- **Muscular endurance** is the ability of a muscle, or a group of muscles, to sustain repeated contractions or to continue applying force against a fixed object. Push-ups and curl-ups are often used to test muscular endurance. The person's endurance is expressed as the number of repetitions completed without stopping for a set period of time (often one minute).
- **Flexibility** is the ability to move joints through their full range of motion. The sit-and-reach test is a good measure of flexibility of the lower back and the backs of the upper legs (hamstrings). A person's flexibility is usually expressed in how far a joint can be moved or the degrees through which a joint can be moved.
- **Body composition** refers to the makeup of the body in terms of lean mass (muscle, bone, vital tissue, and organs) and fat mass. Good body composition has strong bones, adequate skeletal muscle size, a strong heart, and a low amount of fat mass. Regular physical activity and exercise will help decrease body fat and increase or maintain muscle mass, increase bone mass, and improve heart function. Although body composition entails muscle, bone, and fat, it is often expressed only as percentage of body fat.

Many types of tools can be used to assess body composition, including skinfold callipers, bioelectrical impedance analyzers (found in many weigh scales), body mass index (BMI), underwater weighing, and dual energy X-ray absorptiometry (the latest in tools).

## Principles of Fitness Development

The keys to selecting the right kinds of exercises for developing and maintaining each of the basic components of fitness are found in the principles of specificity, overload, reversibility, progression, diminishing returns, and individual differences.

- **Specificity:** The type of training in which individuals engage should be directed specifically at improving their abilities in life. Therefore, choose the right kind of activities to improve each physical fitness component, and the right combination of physical fitness components to help in activities of daily living. Strength training results in increases in strength for the muscles being exercised but does little to improve cardiorespiratory endurance.

Also, train specifically for the specific activity of interest. For example, optimal running performance is best achieved when the muscles involved in running are trained for the movements required. It does not necessarily follow that a good swimmer is a good runner. Specificity also requires that one consider the speed of motion, the number of limbs moving, the direction in which they are moving, and the range over which the movement occurs.

- **Overload:** If a person works often (frequency) enough, hard (intensity) enough, and long (duration) enough to load the body above its resting level, physical fitness will improve. If this is done regularly over a period of time, the body will gradually adapt to the increase in demands. The term *overload* does not refer to the idea that one needs to overexert or exert at high intensities to obtain gains in fitness; it simply means that one needs to load the body more than it is usually accustomed to.

- **Reversibility:** Physical fitness or the effects of a physical activity program or an exercise program cannot be stored. If a person stops training for a period of time (three to five days, in some cases) a process of detraining will begin. The gains in fitness that were made begin to reverse themselves. If no exercise is done for a long enough period, fitness levels can revert to the original starting point. At least three balanced workouts a week (three hours minimum) are necessary to maintain a good level of fitness.
- **Progression:** Increasing the frequency, intensity, and/or duration of an activity over periods of time is necessary for continued improvement in physical fitness. Improvements in physical fitness are realized fairly rapidly at the onset of an exercise or training program. The rate of improvement will gradually slow down and level off (adaptation) if an overload is present (meaning that the load is increasing and that there is progress). At high levels of physical fitness it may even be necessary to change the type(s) of exercise(s) being performed.
- **Diminishing returns:** The fitter a person becomes, the more difficult it is to continue to become fitter at the same rate. Individuals who begin jogging can, over a relatively short time, improve the speed and duration of their runs. However, experienced distance runners may have to spend an entire training season to decrease their run time by just a few seconds.
- **Individual differences:** Every person has a unique physical and psychological makeup that requires a unique training program. Factors that may play a role are current fitness level, gender, age, heredity, susceptibility to injury, rest and recovery needs, and diet. Two people working out with the same program could experience completely different results.

Some activities can be used to fulfill more than one of a person's basic exercise requirements. For example, in addition to increasing cardiorespiratory endurance, running builds muscular endurance in the legs, and swimming develops the arm, shoulder, and chest muscles. If the proper physical activities are selected, it is possible to fit parts of a muscular endurance workout into a cardiorespiratory endurance workout and save time.

## The FITT Principle

A well-designed personal physical activity plan will outline how often (frequency), how long (time), and how hard (intensity) a person exercises, and what kinds of exercises (type) are selected. The exercise frequency, intensity, time, and type (FITT principle) are key components of any fitness plan or routine.

An individual's goals, present fitness level, age, health, skills, interest, and availability of time are among the factors to consider in developing a personal physical activity plan. In particular, every plan should have a schedule that progresses over time. Progression can take the form of changes in any of the FITT components, but not all at once. For example, an athlete training for high-level competition would follow a different program than would a person whose goals are to develop good health from a sedentary start. Regardless of the specific goals, both programs would be based upon the elements of the FITT principle.

Initially, a personal physical activity plan does not need to include all the health-related fitness components. The choice of which components to focus on initially should be based upon the likelihood of adopting the new behaviour and a consideration of whether the goals are SMART (specific, measurable, attainable, realistic, and time framed – see Module B, Lesson 5). Over the course of weeks or months, other components would be added. A common progression is to adopt a CRE program (three times a week, 20 minutes per session, moderate intensity) without specific muscular strength or muscular endurance elements. After each CRE session the cool-down would simply entail a few stretches for flexibility. After a few weeks of successful completion of the program, a new element could be added.

*\*see table on next page*

## RM 11–FM: FITT Principle Guidelines

Fitness and/or Health Benefit	Variables			
	F Frequency	I Intensity	T Time	T Type
<b>Cardiorespiratory Endurance (CRE)</b> (Aerobic)	3 to 5 times per week	moderate to vigorous intensity (60% to 85% of maximum heart rate)	minimum of 20 minutes	running cycling cross-country skiing (continuous motion of large muscle group[s])
<b>Muscular Strength</b>	2 or 3 times per week, with rest days in between bouts	high resistance (sets to maximum capability)	minimum of 20 minutes per session 1 to 3 sets of 6 to 10 repetitions	free weights universal gym tubing body weight
<b>Muscular Endurance</b>	2 or 3 times per week, with rest days in between bouts	low to moderate resistance	minimum of 20 minutes per session 3 sets of 16 to 20 repetitions	free weights universal gym tubing body weight
<b>Flexibility</b>	daily	slow and controlled movement	10 to 12 minutes	static
<b>Body Composition</b>	5 to 7 times per week	combination of intensities	dependent on intensity	aerobic anaerobic resistance
<b>Anaerobic</b>	alternate days 2 or 3 times per week	90% of maximum heart rate	2 to 3 minutes per bout	sprinting jumping
<b>Active Daily Living / Health</b>	daily	low to moderate intensity	30 to 60 minutes	gardening walking bowling

**References:**

Manitoba Fitness Council. *Active Healthy People: Fitness Theory Manual*. Winnipeg, MB: Manitoba Fitness Council, n.d.  
 ---. *Resistance Training Manual*. Winnipeg, MB: Manitoba Fitness Council, n.d.

## RM 9–FM: Level of Exertion/Intensity

Level of Exertion/Intensity				
Amount of Effort				Exertion Description
Rate of Perceived Exertion (RPE) Scale (Modified Borg Scale)	Intensity Descriptor	Heart-Rate Range* (Age Based)  Maximum Heart Rate (MHR)	Exertion Descriptor	
1	LIGHT	50% – 65% of MHR	Resting	You are breathing normally. It is very easy to talk.
2			Somewhat Light	Your rate of breathing increases slightly, but it is still easy to talk.
3			Light	You notice your breathing. You can still talk fairly easily.
4	MODERATE	65% – 80% of MHR	Medium	You are breathing more heavily, but you do not hear yourself breathe.
5			Somewhat Hard	You can hear yourself breathe, but can still talk.
6			Medium Hard	It is getting difficult to talk.
7	VIGOROUS	80% – 100% of MHR	Hard	You are breathing heavily. It is difficult to talk.
8			Very Hard	Your breathing is laboured. It is very difficult to talk.
9			Gruelling	It is almost impossible to talk.
10			Maximum	You are breathing very heavily. You cannot talk. You may feel pain.

## RM 12–FM: Split Routines for Resistance Training

The following page provides examples of routines to be considered when developing a resistance training routine:

- Two-Day Split Routine
- Three-Day Split Routine
- Four-Day Split Routine

Also provided is an example of a Total Body Resistance Routine in two-day, three-day, and four-day formats. Be sure to include at least one to two days of rest to allow for recovery.

To determine the appropriate number of sets and repetitions for resistance training, refer to the following table.

<b>Defining Participant Experience</b>			
Participant	Stage of Change	Resistance Training Recommendations	Muscular Endurance and Strength Training
<b>Beginner</b> Little or no previous experience	Pre-contemplation Contemplation Preparation/ Decision	1 exercise per body part 1 set per body part	Endurance training for first six weeks
<b>Intermediate</b> Limited experience but active within last three months	Action	1 or 2 exercises per body part 1 or 2 sets per body part (As one becomes more experienced with resistance training, one will need to increase the sets and exercises to create overload and to challenge the body.)	Endurance and strength training
<b>Advanced</b> Prior experience and active for last six months  <b>R</b> <b>M</b>  <b>1</b> <b>2</b> – <b>F</b>	Maintenance	1 to 3 exercises per body part 1 to 3 sets per body part (As one becomes more experienced with resistance training, one will need to increase the sets and exercises to create overload and to challenge the body.)	Endurance and strength training



## M: Split Routines for Resistance Training *(Continued)*

### Two-Day Split Routine

Ideal for Beginner, Intermediate, and/or Advanced	Day 1	Legs	Back	Biceps	
	Day 2	Chest	Triceps	Shoulder	Core
	Day 3	Rest or go back to Day 1 and repeat.			

### Three-Day Split Routine

For Intermediate or Advanced	Day 1	Chest	Triceps	Shoulders
	Day 2	Back	Biceps	Core
	Day 3	Quads	Hamstrings	Calves
	Day 4	Rest or go back to Day 1 and repeat.		

### Four-Day Split Routine

For Intermediate or Advanced	Day 1	Chest	Triceps	Core
	Day 2	Quads	Hamstrings	
	Day 3	Back	Biceps	
	Day 4	Shoulders	Core	
	Day 5	Rest or go back to Day 1 and repeat.		

### Total Body Resistance Routine

Ideal for Beginner, Intermediate, or Advanced	Day 1 Day 3 Day 5 Day 7 Day 1 (Rest) Day 2 Day 4 Day 6 Day 7 (Rest) Day 1 Repeat	<b>Order of Exercises</b> Chest Back Triceps Biceps Shoulders Legs Core
	Day 1 Day 3 Day 5 Repeat	<b>Order of Exercises</b> Chest Back Triceps Biceps Shoulders Legs Core
	Day 1 Day 5 Repeat	<b>Order of Exercises</b> Chest Back Triceps Biceps Shoulders Legs Core