

Lesson 6: Planning for Physical Fitness

Introduction

In this lesson students review the basics of physical fitness, including

- definitions of physical fitness
- health- and skill-related fitness components
- principles of fitness development
- the FITT principle
- resistance training

At the completion of this lesson students develop and implement an exercise routine as part of their personal physical activity practicum (see Module A).



Specific Learning Outcomes

- 11.FM.4** Demonstrate an understanding of the concepts and principles related to the development and implementation of a personal physical activity plan.
Examples: cardiorespiratory endurance/aerobic fitness, musculoskeletal fitness, training principles, FITT (frequency, intensity, time, type) principle
- 11.FM.5** Design, implement, evaluate, and revise an exercise routine that contributes to the health-related fitness components.
Examples: resistance training, walking, running programs
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Key Understandings

- Physical fitness is a complex concept related to the effects of physical activity on the human body.
 - Physical fitness comprises health- and skill-related components.
 - The development of physical fitness is governed by the FITT principle.
 - Planning is important for successful physical fitness development.
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Essential Questions

1. What is the definition of *physical fitness*?
 2. How did the FITT principle help you to develop your exercise routine?
 3. Explain how your exercise routine contributed to the five health-related components of physical fitness.
 4. If you were helping someone begin a resistance training program, what guidelines and safety considerations would you provide?
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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.



Refer to RM 8-FM: Fitness Rating of Common Activities (available in Word and Excel formats).



Background 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

DEFINITIONS

physical fitness

"A set of attributes that people have or achieve that relate to their ability to perform physical activity" (Howley and Franks).

"A set of attributes, primarily respiratory and cardiovascular, relating to the ability to perform tasks requiring expenditure of energy" (*Stedman's Concise Medical Dictionary for the Health Professions*).

"The ability to perform moderate to vigorous levels of physical activity without undue fatigue and the capability of maintaining such ability throughout life" (American College of Sports Medicine).

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.

Knowing the Basics of Physical Fitness

Physical fitness is more easily understood by examining its components, or parts. As students have learned in earlier grades, there are two categories of physical fitness components: health-related fitness components and skill-related fitness components:

- **Health-related fitness components** consist of
 - cardiorespiratory endurance
 - muscular strength
 - muscular endurance
 - flexibility
 - body composition
- **Skill-related fitness components** include
 - agility
 - balance
 - coordination
 - speed
 - power
 - reaction time

This lesson focuses on the health-related fitness components.

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.



For more information on exercise intensity, refer to RM 9-FM: Level of Exertion/Intensity.

For more information on cardiorespiratory endurance values for unfit and fit individuals, refer to RM 10-FM: Comparative Chart of Cardiorespiratory Endurance (CRE) for Unfit and Fit Individuals.

- **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.



For additional information, refer to RM 11-FM: FITT Principle Guidelines.

Applying the FITT Principle

According to the FITT principle, an exercise routine should include exercises and activities that will improve the health-related fitness components:

- cardiorespiratory endurance
- muscular strength
- muscular endurance
- flexibility

Each workout or exercise session should begin with a warm-up and end with a cool-down. Generally, rest and recovery are as important to plan as the physical activity and exercise, and should be equally spaced between workouts. The more intense the exercise is, the longer the time required to recover. Likewise, the more novel the exercise is, the longer the time required to recover. Trying to adopt all aspects of health-related fitness at once may not be realistic. Begin with small realistic goals in one or two areas of health-related fitness and plan to introduce more as time progresses and new behaviours become habits.

The following guidelines are provided to identify the amount of activity or exercise necessary for the average healthy person to attain and/or maintain a minimum level of overall fitness. Included are examples of activities/exercises, as well as safety considerations for each health-related fitness component.

- **Warm-up:** Warm-up activities are crucial parts of any exercise routine or sports training to prepare the body and mind for movement. The importance of a structured warm-up routine should not be underestimated in relation to preventing injury, having optimal performance, and maximizing enjoyment. An effective warm-up increases both the respiratory rate and the heart rate. This helps increase the body's core temperature, while also increasing the body's muscle temperature through an increase in the delivery of oxygen and nutrients to the working muscles. Increasing muscle temperature helps make the muscles loose, supple, and pliable. Another reason why warm-up activities are important is that they provide the participant with an opportunity to prepare mentally for the upcoming exercise session.

A warm-up should consist of light physical activity for 5 to 10 minutes of exercise, such as walking, slow jogging, knee lifts, arm circles, or trunk rotations. Low-intensity movements that simulate movements to be used in the activity can also be included in the warm-up. Static stretching, per se, is not considered part of a warm-up routine. A warm-up can consist of a lower intensity form of the exercise about to commence.

- **Cardiorespiratory endurance (CRE):** At least three 20- to 30-minute bouts of aerobic (activity requiring oxygen) exercise each week are recommended. Popular aerobic conditioning activities include brisk walking, jogging, swimming, cycling, rope-jumping, rowing, cross-country skiing, and some continuous action games such as basketball and soccer. The type of activity suitable for a person to develop cardiorespiratory fitness is dependent upon the person's initial fitness. A jog may be intense for one individual and serve as a warm-up for another.

Safety Considerations

To ensure safety, the following need to be considered:

- Know how to calculate target heart-rate zone.
- Know how to monitor intensity (e.g., talk test, rate of perceived exertion, heart-rate monitors).
- When increasing the intensity (speed, incline, and/or resistance) or duration of exercise, keep in mind the **10 percent rule** (e.g., if a person is running continuously for 10 minutes per session in week 1, then in week 2 the maximum increase recommended would be to run continuously for 11 minutes per session).
- Include a variety of activities to avoid overuse injuries or to prevent boredom.
- Include a cardiorespiratory cool-down. To prevent post-exercise peril (e.g., dizziness, light-headedness, fainting), gradually reduce the heart rate, breathing rate, and body temperature before moving on to resistance training or flexibility training. This could be accomplished by simply walking slowly for 5 to 10 minutes.
- **Resistance training:** Resistance training is used primarily to develop muscular strength and muscular endurance, but can develop cardiorespiratory endurance if it is incorporated within a circuit-type workout.
 - **Muscular strength:** Two or three 20-minute sessions each week that include exercises for all the major muscle groups are required. Lifting weights is one of the most effective ways to increase strength. For sedentary people, as little as two workouts per week can be beneficial.
- and/or
- **Muscular endurance:** Two to three 30-minute sessions each week that include exercises such as calisthenics, push-ups, curl-ups, pull-ups, and light weight training for all the major muscle groups are required.

10 Percent Rule

Increase selected activity **no more** than 10 percent per week.

For a sedentary person, muscular strength and muscular endurance sessions can be combined and limited to two sessions per week. Then, as the behaviour is adopted (becomes a habit), additional sessions per week can be added.

Most of the skill-related components of fitness can also be developed with resistance training. Most people associate weightlifting with resistance training. Although lifting weights is one of the most effective forms of resistance training, it is not the only one. Other forms include the use of medicine balls, body balls, elastic bands, and calisthenics.

General Resistance Training Guidelines

When engaging in resistance training, exercises must be performed to the point of **fatigue** or **failure** (i.e., cannot complete one more repetition), regardless of whether one is training for strength or for endurance. If it feels as if four more repetitions could have been performed after the set is completed, then there was not sufficient overload.

Additional guidelines for resistance training include the following:

- **Sessions:** A minimum of 2 or 3 sessions per week are required to see change (2 for beginners, more than 2 for intermediate and advanced).
- **Muscle or muscle group:** Perform 1 to 3 exercises per muscle or muscle group (1 for beginners, 1 or 2 for intermediate, 1 to 3 for advanced). Change each exercise for each muscle group every one to two months to prevent injuries and boredom.
- **Sets:** Perform 1 to 3 sets per exercise (1 for beginners, 1 or 2 for intermediate, 1 to 3 for advanced).
- **Repetitions:** Do 6 to 20 repetitions (16 to 20 = endurance, 10 to 16 = strength/endurance, 6 to 10 = strength). Cycle through all three repetition ranges — first month for endurance, second month for strength/endurance, third month for strength, and so on. Allow 30 to 90 seconds for isometric/static activities.

Safety Considerations

To ensure safety, the following need to be considered:

- Seek guidance from the physical education instructor or weight room supervisor.
- Include a general warm-up prior to resistance training even if not engaging in any CRE workout.
- Make sure that a qualified instructor shows how to perform the exercises correctly. Good form reduces the risk of injury and leads to faster gains in muscle size and strength.
- Before using free weights, bars, and plates, beginners should consider using body weight exercises and cable machine exercises until they have learned proper technique and have established that they can stabilize their core effectively.
- Wear appropriate clothes and protective equipment. For example, gloves reduce the risk of blisters. Solid running shoes provide a stable base from which to exercise.
- Check all equipment before using it. Do not use a piece of equipment if it seems faulty. Inform the physical education instructor or weight room supervisor at once.
- Always secure weight plates with safety collars.

- Don't hold the breath while lifting weights. In general, breathe out on the exertion or when tightening the muscle, and breathe in when lowering the weight or returning to the start position.
 - Never completely straighten a joint.
 - Work big muscle groups before small ones.
 - Perform multi-joint exercises before single-joint exercises.
 - Train the core area last.
 - Never work the same muscle or muscle group two days in a row.
 - Stand on a non-slip surface to reduce the risk of slips and falls.
 - When in a situation where a "spotter" may be required, check with the physical education instructor or weight room supervisor regarding safety and proper technique.
 - Stop immediately if an injury occurs or if pain is felt, and consult a physician for diagnosis and treatment. Understanding the difference between pain and muscle fatigue/failure is important.
 - Always control the speed of the lifting and lowering. It is recommended that one repetition should take approximately 4 to 7 seconds to complete. Avoid jerky motion.
- **Flexibility:** At the end of every workout, perform 5 to 10 minutes of static stretching exercises. If a workout session includes a CRE session and a resistance training session, flexibility is best left to the end of the entire exercise routine.

Safety Considerations

To ensure safety, the following need to be considered:

- A stretch should feel like a gentle pull and should not be painful.
- Avoid bouncing.
- Work towards holding a stretch for 30 seconds.
- Remember to breathe normally.
- Be sure to stretch tight postural muscles (e.g., chest) as well as the muscle focused on in the workout.

Designing an Exercise Routine

In developing their exercise routine, students need to consider the general guidelines outlined earlier in this lesson in relation to the discussion of the FITT principle.

The definitions provided in the following table are intended to support individuals in determining where they are on the Stages of Change continuum and in selecting appropriate exercises for an exercise routine. Refer to this table when assisting students in the appropriate selection, sequencing, and planning of cardiorespiratory and resistance training exercises.

Defining Participant Experience			
Participant	Stage of Change	Resistance Training Recommendations	Muscular Endurance and Strength Training
Beginner Little or no previous experience	<ul style="list-style-type: none"> ▪ Pre-contemplation ▪ Contemplation ▪ Preparation/Decision 	1 exercise per body part 1 set per body part	Endurance training for first six weeks
Intermediate Limited experience but active within last three months	<ul style="list-style-type: none"> ▪ 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
Advanced Prior experience and active for last six months	<ul style="list-style-type: none"> ▪ 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

- **Beginners**

Beginners may start with a cardiorespiratory plan as the first step in developing their exercise routine. The following suggestions should be used in conjunction with the FITT principle:

- For some students, simply walking three times a week may be a start in their exercise routine. Their plan would then involve increasing the walking time (number of minutes of walking), increasing the speed of walking, or increasing the frequency of walking (e.g., from three to five times per week). These changes could take a month or so before any other fitness component was added.

- A pedometer program can be used for some students. All that is required is a pedometer and a monthly calendar. Students record the number of steps they take for the first week and then determine a goal for the total number of steps the next week using the 10 percent rule. Students record their daily step counts and use their weekly totals to observe change.

Step-Count Guidelines for ADULTS	
Steps per Day	Description
< 5000 steps/day	
5000 - 7,499 steps/day	typical or low active
> 7500 - 9,999 steps/day	somewhat active
> 10,000 steps/day	active
> 12,5000 steps/day	highly active
For Active CHILDREN	
12,000 – 16,000 steps/day	

- Beginners may consider incorporating resistance training once they have achieved a base of cardiorespiratory (aerobic) fitness, established the habit of being physically active, improved body awareness, and gained confidence.

- **Intermediate or Advanced**

- For students who already participate in cardiorespiratory activities (e.g., intermediate or advanced) it is suggested that they incorporate some resistance training in their exercise routine.
- Students who are advanced in their resistance training may simply continue with an existing plan, but will add new and different exercises. Be sure that these students make a plan for their cardiorespiratory fitness.

Regardless of their experience (beginner, intermediate, or advanced), students must

- include **exercises from the major muscle groups** (i.e., chest, back, shoulders, biceps, triceps, core, quadriceps, hamstrings) in their exercise routine
- identify the **safety procedures** they will use in executing their exercise routine

Refer to the discussion of Applying the FITT Principle earlier in this lesson.

There are a number of ways to design a resistance training routine with respect to the number of days to train and the muscle groups to include on a particular day. RM 12-FM provides examples of two-day, three-day, and four-day split routines to be considered when developing a resistance training routine. Also provided is an example of a total body resistance routine in two-day, three-day, and four-day formats.



Refer to RM 12-FM: Split Routines for Resistance Training.

Resistance Training Planner

A Resistance Training Planner is available to assist with planning an exercise routine. This tool contains over 250 exercises of the major muscle groups and provides information on how to perform these exercises correctly and safely. The planner also contains links to other websites for obtaining additional information.

The Resistance Training Planner (Excel spreadsheet) is available online at www.edu.gov.mb.ca/k12/cur/physhlth/curriculum.html.



To record or log resistance training sessions, refer to RM 13-FM: Resistance Training Log.

RM 8–FM: Fitness Rating of Common Activities

Rate the degree of fitness required (in relation to each of the four health-related fitness components) for each of the activities listed below. Use a rating scale from 1 to 10, with 1 being little or no fitness requirement and 10 being the greatest fitness requirement. (Highest possible overall score = 40.)

Activity	Fitness Rating for Health-Related Fitness Components				Overall Fitness Rating
	Cardiorespiratory Endurance	Muscular Strength	Muscular Endurance	Flexibility	
Sports					
Cross-Country Skiing					
Volleyball					
Bowling					
Step Aerobics					
Ice Hockey					
Other?					
Daily Activities					
Mowing the Lawn					
Vacuuming the House					
Shovelling Snow					
Other?					
Occupations					
Mail Carrier					
Flight Attendant					
Roofer / Shingler					
Waiter / Waitress					
Other?					

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.

* The heart-rate range may vary, depending on the source of reference, age, physical abilities, individual fitness levels, and so on.

RM 10–FM: Comparative Chart of Cardiorespiratory Endurance (CRE) for Unfit and Fit Individuals

(Based on Performance on 20 m Beep Test)

Level of Fitness	Level Completed on 20m Beep Test	VO2 Max* mL/kg/min.	Moderate Intensity (60% of VO2 Max)	Vigorous Intensity (80% of VO2 Max)
Unfit—Low CRE	4	26	15.6	20.8
			walking fast	slow jog
			15 min./mile	
Very Fit—High CRE	14	60.64	36.384	48.512
			running at 6 mph	running at 8 mph
			10 min./mile	7.5 min./mile

* VO2 Max—the maximum amount of oxygen, in millilitres, one can use in one minute per kilogram of body weight.

Pace min./mile	Treadmill Speed mile/hr. (mph)	ACSM* Walk/Run Equations metres/min.		VO2 Max mL/kg/min.
30	2	53.6	0.1	8.86
20	3	80.4	0.1	11.54
15	4	107.2	0.1	14.22
12	5	134	0.2	30.3
10	6	160.8	0.2	35.66
8.571428571	7	187.6	0.2	41.02
7.5	8	214.4	0.2	46.38
6.666666667	9	241.2	0.2	51.74
6	10	268	0.2	57.1
5.454545455	11	294.8	0.2	62.46
5	12	321.6	0.2	67.82

*ACSM—American College of Sports Medicine.

Completed Level on 20 m Beep Test	Corresponding VO2 Max mL/kg/min.
4	26.04
5	29.5
6	32.95
7	36.42
8	39.88
9	43.3
10	46.8
11	50.26
12	53.7
13	57.2
14	60.64
15	64.1

RM 11–FM: FITT Principle Guidelines

Fitness and/or Health Benefit	Variables			
	F Frequency	I Intensity	T Time	T Type
Cardiorespiratory Endurance (CRE) (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 of large muscle group[s])
Muscular Strength	<ul style="list-style-type: none"> ▪ 2 or 3 times per week, with rest days in between bouts 	<ul style="list-style-type: none"> ▪ high resistance (sets to maximum capability) 	<ul style="list-style-type: none"> ▪ minimum of 20 minutes per session ▪ 1 to 3 sets of 6 to 10 repetitions 	<ul style="list-style-type: none"> ▪ free weights ▪ universal gym ▪ tubing ▪ body weight
Muscular Endurance	<ul style="list-style-type: none"> ▪ 2 or 3 times per week, with rest days in between bouts 	<ul style="list-style-type: none"> ▪ low to moderate resistance 	<ul style="list-style-type: none"> ▪ minimum of 20 minutes per session ▪ 3 sets of 16 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"> ▪ 10 to 12 minutes 	<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

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 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.

Defining Participant Experience			
Participant	Stage of Change	Resistance Training Recommendations	Muscular Endurance and Strength Training
Beginner Little or no previous experience	<ul style="list-style-type: none"> ▪ Pre-contemplation ▪ Contemplation ▪ Preparation/ Decision 	1 exercise per body part 1 set per body part	Endurance training for first six weeks
Intermediate Limited experience but active within last three months	<ul style="list-style-type: none"> ▪ 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
Advanced Prior experience and active for last six months	<ul style="list-style-type: none"> ▪ 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

Continued

RM 12–FM: Split Routines for Resistance Training *(Continued)*

Two-Day Split Routine

Ideal for Beginner, Intermediate, and/or Advanced	Day 1	Legs	Back	Biceps	Core
	Day 2	Chest	Triceps	Shoulder	
	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	Order of Exercises Chest Back Triceps Biceps Shoulders Legs Core
	Day 1 Day 3 Day 5 Repeat	Order of Exercises Chest Back Triceps Biceps Shoulders Legs Core
	Day 1 Day 5 Repeat	Order of Exercises Chest Back Triceps Biceps Shoulders Legs Core

