

# CHAPTER 15

## ASSESSMENT CATEGORIES

-  Application
-  Communication
-  Knowledge and Understanding
-  Thinking

# Enhancing Health, Study, Work, and Play Through Physical Fitness

Activities in this chapter:

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**2** **Components and Principles of Fitness Programs 210**

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**3** **Designing Fitness Training Programs 214**

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## 1

## DEFINITIONS AND COMPONENTS OF PHYSICAL FITNESS

(Textbook pages 330–340)



### 1 Key Terms and Definitions



Define the key terms below in your own words.

Key Term	Definition
absolute $\dot{V}O_2$ max	
active flexibility	
aerobic power ( $\dot{V}O_2$ max)	
agonist–antagonist training	
body composition	
cardiorespiratory (cardiovascular) endurance	
collagen	
dynamic (ballistic) stretching	
elastin	
exercise	



flexibility	
muscular endurance	
muscular strength	
passive flexibility	
physical activity	
physical fitness	
power	
proprioceptive neuromuscular facilitation (PNF) stretching	
psychomotor ability	
relative $\dot{V}O_2$ max	
static stretching	

## 2 Components of Physical Fitness

Physical fitness is achieved when all the physiological systems of the body are functioning efficiently to meet the physical demands of everyday activities. List the six major components of physical fitness by filling in the blanks in the figure below.



**PHYSICAL FITNESS**

The diagram features six circular images arranged around the central text 'PHYSICAL FITNESS'. Each image is overlaid with a white rectangular label for text entry:

- Top-left: A group of people participating in a team sport, possibly soccer or basketball.
- Top: A woman performing a bicep curl with a dumbbell.
- Top-right: A woman performing a sit-up or core exercise.
- Bottom-right: A group of male runners competing in a race.
- Bottom: A woman performing a sit-up or core exercise.
- Bottom-left: A woman receiving a massage or physical therapy treatment.



**⚡ 3 Agonist–Antagonist Training**

**🔍** When planning and designing training routines, it is important to include exercises that stimulate both the working muscles (agonists) and the counteracting muscles (antagonists). Complete the table below, making suggestions for exercises that could be used when taking an agonist–antagonist training approach.

Muscle Agonist	Muscle Antagonist	Exercise Suggestions
Biceps		
	Hamstrings	
	Tibialis anterior	
Trunk flexors (abdominals)		



## 2

## COMPONENTS AND PRINCIPLES OF FITNESS PROGRAMS

(Textbook pages 341–348)



### 1 Key Terms and Definitions



Define the key terms below in your own words.

Key Term	Definition
explosive load increase	
gradual load increase	
periodization of training principle	
progressive resistance (overload) principle	
reversibility principle	
specificity of exercise principle	
training frequency	
training intensity	
training time	
training volume	



work-to-rest ratio	
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## 2 FITT to Be Square



The mnemonic FITT can be used to remember the four major training components that should be considered when designing a comprehensive fitness program. Match each word on the left with its meaning on the right by writing the corresponding letter in the space provided.

- |           |       |                                    |
|-----------|-------|------------------------------------|
| Frequency | _____ | A) What activity should I do?      |
| Intensity | _____ | B) How often should I exercise?    |
| Time      | _____ | C) How hard do I need to exercise? |
| Type      | _____ | D) How long should I exercise for? |

In the following table, check off whether each activity relates to *frequency*, *intensity*, or the amount of *time* the activity is performed.

Activity	Frequency	Intensity	Time
Exercising more often			
Cross-country skiing faster			
Rowing a longer distance			
Swimming six days per week instead of three			
Increasing number of sets			
Increasing number of repetitions per set			
Increasing the pace of cycling			
Stretching farther			
Playing soccer five days per week instead of three			
Holding a stretch longer			
Going all out on a 400-meter run			
Increasing the amount of weight lifted			
Making the heart beat faster			
Running uphill instead of running in the stadium			
Lifting weights four times per week instead of one			





#### 4 Warm-up and Cool-down

After reading the warm-up and cool-down section in the textbook (page 344) and doing some research on the Internet, answer the following questions.

**A.** Why is the warm-up phase of an athlete’s training program important?

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**B.** Why is the cool-down phase of an athlete’s training program important?

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**C.** Design a personal warm-up routine for a sport or activity of your choice. In your program consider (1) activities that will raise your heart rate; (2) stretching exercises (general and specific) you would like to do; and (3) the length of time devoted to the warm-up.

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**D.** Design a personal cool-down routine for a sport or activity of your choice. Also describe how you feel immediately after the cool-down, four hours later, and the next day.

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## 3

**DESIGNING FITNESS TRAINING PROGRAMS** (Textbook pages 348–359)**1 Key Terms and Definitions**

Define the key terms below in your own words.

Key Term	Definition
activity cross training	
aerobic cross training	
anaerobic threshold	
breath sound check	
circuit training	
continuous training	
endurance training	
Fartlek	
muscular endurance cross training	
slow long distance (SLD) training	



station training	
talk test	
ventilatory threshold	



## 2 Training Methods and Effects

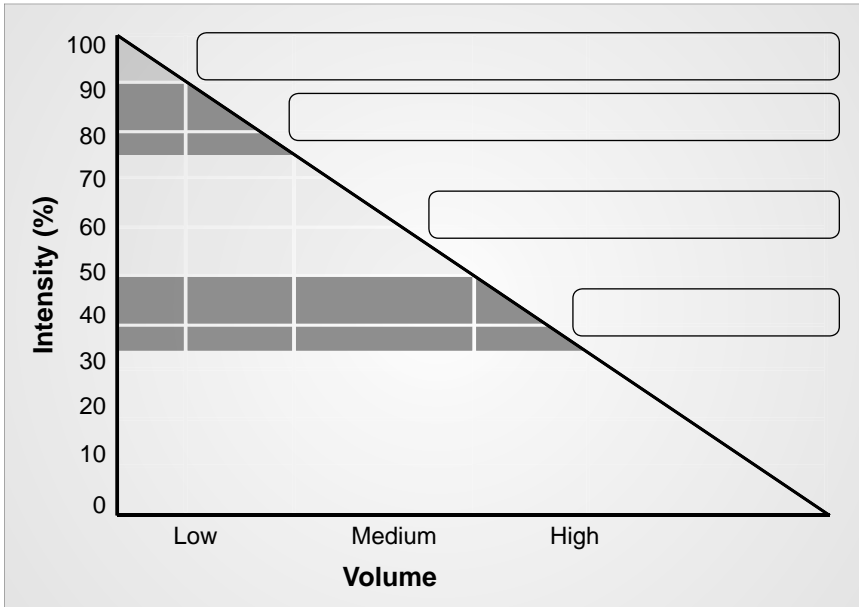


Complete the following table by filling in the training effects that correspond with the specific training method.

Training Method	Training Effect
<b>Resistance Training</b>	
• Circuit training	•
• Station training	•
<b>Cardiorespiratory Training</b>	
• Endurance training	•
• Tempo or repetition training	•
• Interval training	
- extensive interval	•
- intensive interval	•
• Fartlek training	•
<b>Combination Training</b>	
• Cross training	•
• Combo circuit training	•

### 3 Method to the Madness

The graph below outlines the four basic cardiorespiratory training methods as a function of intensity and volume of exercise. Fill in the missing labels using the **word bank** provided.



**Word Bank**

- endurance method
- extensive interval method
- intensive interval method
- periodization method
- progressive resistance method
- repetition method

### 4 Fitness Training for Competition

Sean is an experienced sprinter and has been training for competition all year round. He is following a detailed training program designed by his coach, based on the systematic division of the training year into several periods. The program is designed to prepare Sean to achieve his optimal performance against Usain Bolt in the 100-meter sprint at the next world championships. Depending on the specific training period, a different type of training method is used. Considering the number of repetitions, sets, and rest intervals presented in the table below, identify (1) the training method used; (2) the intensity of training; and (3) the major training period when the method is used.

Repetitions	Sets	Rest Intervals	Training Method	Intensity (high medium low)	Training Period
1	1	0			
6	5	4			
5	2	1			
1	4	3			



## 4

## CHECK YOUR UNDERSTANDING



## Multiple Choice

- Physical fitness:
  - is thought to be a measure of one's physical health
  - limits the amount of physical activity that can be performed
  - is the ability of the body to adjust to the demands of physical effort
  - all of the above
  - A and C only

**Answer:** \_\_\_\_\_

- Which of the following statements about cardiorespiratory endurance is **false**:
  - Cardiorespiratory fitness is the ability to produce energy through an improved delivery of oxygen to the working muscles.
  - The maximal rate at which the body can take up, transport, and utilize oxygen is known as aerobic power, which is expressed as  $\dot{V}O_2\text{max}$ .
  - To account for differences in mass,  $\dot{V}O_2\text{max}$  can be expressed in a relative manner.
  - Absolute measurements of  $\dot{V}O_2\text{max}$  are useful for comparison within groups.
  - None of the above.

**Answer:** \_\_\_\_\_

- Which of the following is **not** a psychomotor ability:
  - reaction time
  - balance
  - decision making
  - muscle feeling
  - stamina

**Answer:** \_\_\_\_\_

- The warm-up prepares the body and mind for the exercise activity by:
  - raising the body temperature and decreasing respiration and heart rate
  - decreasing central nervous system activity, which improves coordination
  - increasing metabolic rate and oxygen exchange
  - increasing muscle tension to guard against strains
  - Both B and D

**Answer:** \_\_\_\_\_

- Completion of all the sets of one exercise before moving to the next exercise is referred to as:

- resistance training
- station training
- circuit training
- interval training
- repetition training

**Answer:** \_\_\_\_\_



## Fill in the Blanks

Fill in the blanks for the following statements using words from the **word bank** below. Place the corresponding letter from the word bank in the blank spaces provided.

- Muscular strength is the ability of a muscle or muscle group to exert force against \_\_\_\_\_.
- The range of movement achieved with the help of external forces is known as \_\_\_\_\_ flexibility.
- Training time is based on the duration of each training session and the \_\_\_\_\_ of training during a week, month, or year.
- Practicing three-point shots to improve free-throw accuracy contradicts the \_\_\_\_\_ principle of exercise.
- \_\_\_\_\_ training programs simultaneously develop both muscular and cardiorespiratory fitness.

**Word Bank**

- |                |              |                  |
|----------------|--------------|------------------|
| a. active      | e. intensity | i. resistance    |
| b. combination | f. overload  | j. reversibility |
| c. Fartlek     | g. passive   | k. specificity   |
| d. frequency   | h. power     | l. static        |

**True or False**

Indicate whether each statement is **true (T)** or **false (F)**. If the statement is false, provide the correct answer.

1. Fatigue may take longer to develop during static exercises.

**Answer:** \_\_\_\_\_

2. The splits are an example of ballistic stretching.

**Answer:** \_\_\_\_\_

3. A trainee's heart rate is normally used to determine the length of rest between individual sets or series of exercises.

**Answer:** \_\_\_\_\_

4. Interruptions in training have a negative effect on performance, known as the stagnation principle.

**Answer:** \_\_\_\_\_

5. Tempo training involves the systematic alternation of exertion and recovery.

**Answer:** \_\_\_\_\_

**Think and Link**

1. Match the following training principles in Column A with their corresponding description in Column B.

Column A	Answer	Column B
Periodization of training	_____	A) Training loads are increased periodically to stimulate adaptation.
Progressive resistance	_____	B) Interruptions in training have a negative effect and result in stagnation or decline in performance.
Reversibility	_____	C) Training should take into account specific fitness, motor, and neuromuscular parameters.
Specificity of exercise	_____	D) Training is divided into specific periods throughout the year to prepare for competition.

2. Nakeshia is a competitive weightlifter who has been training seriously for over a year. For each statement in the table below, check off whether she should maintain, increase, or decrease her training load or overload.

	Maintain Overload	Increase Overload	Decrease Overload	Stop Training
She lifts weights six days a week.				
After contracting the flu, she has not been back to the club for a week.				
One night, after adding 30 pounds to the barbell while performing squats, she experienced discomfort in her hamstrings.				
Because of inappropriate warming up before heavy weightlifting, she injured one of her gluteal muscles.				
Competition begins in two days.				



### Designing a Circuit

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You are the defense coach of a high school football team. At the beginning of the year, your star player tells you about the fantastic circuit training routine the coaches used at the football camp he attended that summer at the University of Notre Dame. He asks you to design a similar routine for the defense.



Your task is to design a circuit training routine with 8 to 12 stations, where each station represents a component of fitness learned in this chapter. More than one station can cover a particular component of fitness. You must include various upper and lower body exercises and must alter the intensity of the stations to adhere to the FITT principle and the various other principles of fitness training learned in the chapter. Be sure to include other important aspects learned in this chapter such as warm-up, cool-down, sets, repetitions, and rest intervals.

**Rubric**

Level R	Level 1	Level 2	Level 3	Level 4
<p>Circuit is not close to complete.</p> <p>Student did not use the appropriate number of stations.</p> <p>Student potentially copied and pasted a circuit from the text or from the Internet with no originality.</p>	<p>Circuit is somewhat complete.</p> <p>Student was marginally close to the appropriate number of stations.</p> <p>Student made an adequate effort to create a circuit that incorporates some elements learned in the chapter.</p>	<p>Circuit is mostly complete.</p> <p>Student created the minimum number of stations with some error or revision required.</p> <p>Student made a fair effort to complete a circuit that incorporates various elements learned in the chapter.</p>	<p>Circuit is complete.</p> <p>Student adhered to the criteria in the culminating assignment, creating 8 to 12 stations with minimal error and minimal revision required.</p> <p>Student made a substantial effort in completing a circuit that incorporates many of the elements learned in the chapter.</p>	<p>Circuit goes above and beyond the parameters of the culminating assignment.</p> <p>Student created a detailed and thorough circuit training regime that can be used as an exemplar for future classes.</p> <p>Student completed a circuit that incorporates all of the required elements discussed in the chapter.</p>

Name: \_\_\_\_\_

Overall level of achievement: \_\_\_\_\_

Feedback: \_\_\_\_\_

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