CALIFORNIA COMMISSION ON PEACE OFFICER STANDARDS AND TRAINING

Basic Course Workbook Series

Student Materials

Learning Domain 32
Lifetime Fitness
Version 4.0

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THE ACADEMY TRAINING MISSION

The primary mission of basic training is to prepare students mentally, morally, and physically to advance into a field training program, assume the responsibilities, and execute the duties of a peace officer in society.

FOREWORD

The California Commission on Peace Officer Standards and Training sincerely appreciates the efforts of the many curriculum consultants, academy instructors, directors and coordinators who contributed to the development of this workbook. The Commission extends its thanks to California law enforcement agency executives who offered personnel to participate in the development of these training materials.

This student workbook is part of the POST Basic Course Training System. The workbook component of this system provides a self-study document for every learning domain in the Basic Course. Each workbook is intended to be a supplement to, not a substitute for, classroom instruction. The objective of the system is to improve academy student learning and information retention.

The content of each workbook is organized into sequenced learning modules to meet requirements as prescribed both by California law and the POST Training and Testing Specifications for the Basic Course.

It is our hope that the collective wisdom and experience of all who contributed to this workbook will help you, the student, to successfully complete the Basic Course and to enjoy a safe and rewarding career as a peace officer serving the communities of California.

PAUL CAPPITELLI
Executive Director

LD 32: Lifetime Fitness

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Preface

Introduction

Student workbooks

The student workbooks are part of the POST Basic Course Instructional System. This system is designed to provide students with a self-study document to be used in preparation for classroom training.

Regular Basic Course training requirement

Completion of the Regular Basic Course is required, prior to exercising peace officer powers, as recognized in the California Penal Code and where the POST-required standard is the POST Regular Basic Course.

Student workbook elements

The following elements are included in each workbook:

- chapter contents, including a synopsis of key points
- supplementary material
- a glossary of terms used in this workbook

How to Use the Student Workbook

Introduction

This workbook provides an introduction to the training requirements for this Learning Domain. It is intended to be used in several ways: for initial learning prior to classroom attendance, for test preparation, and for remedial training.

Workbook format

To use the workbook most effectively, follow the steps listed below.

Step	Action
1	Begin by reading the: Preface and How to Use the Workbook, which provide an overview of how the workbook fits into the POST Instructional System and how it should be used
2	Refer to the Chapter Synopsis at the end of each chapter to review the key points that support the chapter objectives
3	Read the text
4	Complete the Workbook Learning Activities at the end of each chapter. These activities reinforce the material taught in the chapter
5	Refer to the Glossary for a definition of important terms. The terms appear throughout the text and are bolded and underlined the first time they appear (e.g., **term**)

Chapter 1

Personal Fitness Programs

Overview

Learning need

Officers need to know how to apply methods for evaluating and managing their physical fitness for a healthy lifestyle in order to safely and effectively perform peace officer duties.

Learning objectives

The chart below identifies the student learning objectives for this chapter.

After completing study of this chapter, the student will be able to:	E.O. Code
• Discuss the components of a personal physical fitness program to include: - Cardiovascular o Aerobic o Anaerobic - Muscular o Strength o Power o Endurance - Flexibility/Stability/Mobility - Core - Acceleration and agility - Body composition vs. performance - Recovery	32.01.EO7

Learning objectives (continued)

After completing study of this chapter, the student will be able to:	E.O. Code
• Discuss techniques for evaluating personal fitness in the areas of: - Cardiovascular o Aerobic o Anaerobic - Muscular o Strength o Power o Endurance - Flexibility/Stability/Mobility - Core - Acceleration and agility - Body composition vs. performance - Recovery	32.01.EO8
• Describe appropriate measures for improving an officer's performance within each of the seven components of a personal fitness program	32.01.EO13

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Learning objectives (continued)

After completing study of this chapter, the student will be able to:	E.O. Code
• Discuss principles of physical conditioning, including: - Specificity - Frequency - Intensity - Volume - Active recovery - Periodization/program design o Foundational phase o Conditioning phase o Peak performance phase - Progression	32.01.EO14
• Describe minimum physical conditioning program requirements and components of a training session to include: - Warmup - Training phase - Recovery	32.01.EO18
• Explain the two types of training injuries and appropriate treatment for each: - Acute injuries - Chronic injuries	32.01.EO19

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Overview, Continued

In this chapter

This chapter focuses on personal fitness issues related to peace officers. Refer to the following chart for specific topics.

Personal Lifetime Fitness Program

[32.01.EO7]

Introduction

Any **lifetime fitness** program must include regular exercise. To enhance their performance, peace officers should select an exercise regimen that focuses on increasing and maintaining fitness in seven primary areas.

Leadership

There are seven components to lifetime fitness. They are personal physical fitness, physiological and psychological risk management, lifestyle, **body composition** management, continuing fitness education, and positive attitude. Each of these components is equal in importance to the others. An officer who aspires to a successful career will develop and use a lifetime fitness program.

Basic components of personal fitness

The following table identifies the seven components of a lifetime fitness program and tests to evaluate each.

Component	Description	Self-Evaluation Method(s)
Cardiovascular	The ability of the circulatory and respiratory systems to supply during sustained physical activity	- 1.5 mile run - Beep test
Aerobic	The ability of the heart, lungs, and blood vessels to deliver adequate amounts of oxygen and nutrients to working cells during prolonged physical activity Also known as aerobic fitness, cardio respiratory fitness, and cardiopulmonary fitness	- 1.5 mile run - Beep test

Continued on next page

Basic components of personal fitness (continued)

Component	Description	Self-Evaluation Method(s)
Anaerobic	Anaerobic training is shorter than aerobic training in duration (less than two minutes…) and requires energy from anaerobic sources. Anaerobic energy sources enable the body to perform brief near maximal muscular activity	- 300 meter run
Muscular strength	The maximum force that a muscle can exert at one time	- Bench press - Dead lift - Shoulder press
Muscular Power	The ability of a muscle or muscle group to exert a maximum amount of force in the shortest period of time	- Vertical jump - 12 lb medicine ball throw
Muscular endurance	The ability of a muscle to do continuous work over an extended period of time	- Push ups - Air squats - Sit ups

Continued on next page

Basic components of personal fitness (continued)

Component	Description	Self-Evaluation Method(s)
Flexibility/ Stability/ Mobility	Flexibility: The ability to move a body part (usually a joint or limb) through a full range of motion (ROM) Stability: The ability of a joint or body region to withstand shock and movement without being dislocated or otherwise injured. Stability depends on a number of factors, including the strength of the ligaments that bind the bones together, and the strength of muscles associated with the joint Mobility: The ease with which a joint or series of joints is able to move before being restricted by the surrounding structures. Joint mobility is determined by the ligaments, joint capsule, musculature, and the size and shape of the bones within the joint	Sit and reach test - Full squat to full extension ROM - Isometric stability Timed plank hold and variations Overhead squat (hands up, no weight)
Core	The bodily region bounded by the abdominal wall, hips, glutes, the lower back, and the diaphragm and its ability to stabilize the body during movement (knees to midchest, front and back)	Timed plank hold and variations

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Basic components of personal fitness (continued)

Component	Description	Self-Evaluation Method(s)
<u>Acceleration and Agility</u>	The ability to increase speed from static or after directional changes Quickness and readiness of movement, the ability to change the position of the body with skill and control when faced with some sort of stimulus or opposing movement. Agility requires a combination of skills such as coordination, speed, strength and stamina. It is the union of dynamic balance under changing conditions, and speed	- 300 yard Shuttle run - 50m sprints from static - Cone drills - Illinois Agility Run - Work Sample Test Battery - Beep test
Body Composition vs. Performance	The proportion of fat compared with lean tissue in the body While there is a correlation between the lean body mass to fat ratio and performance, the greater priority is placed on increasing work capacity in a variety of applications	- Bioelectrical impedance - Skinfold calipers
<u>Recovery</u> **<u>Active Recovery</u>**	Period of time immediately after exercise and prior to the next bout of exercise. Intended for muscle, metabolic recovery, and adaptation NOTE: Recovery betweens sets, repetitions, and intervals may require rest, which is commonly referred to as active recovery.	- Cool down - Massage - Stretching - Nutrition - Heart rate - Yoga - Rest/sleep

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Personal Lifetime Fitness Program, Continued

Pre-screening

Before beginning any new physical fitness program participants should be pre-screened to assure they are free from conditions that could be aggravated by exercise and fitness testing. This pre-screening should be performed by a medical professional or other personnel trained to accurately interpret pre-screening results for risk factors.

Pre-screening should include:

- a resting heart rate measurement, and
- a resting blood pressure measurement

Further medical evaluation

If anyone is over 40 years of age and/or has any of the following conditions, they should see a doctor before proceeding with any form of fitness evaluation and training:

- Heart trouble, heart murmur, or heart attack
- Pain or pressure in left of mid-chest area, left neck, shoulder, or arm during or right after exercise
- Faintness or dizziness
- Out of breath after mild exertion
- High blood pressure
- Arthritis or other bone or joint problems

Establishing a baseline

The first step in developing a personal lifetime fitness program is to assess each person's base fitness level for each of the seven basic fitness components. After identifying baseline levels, participants can then select specific exercises of the appropriate intensity and duration to maximize fitness in their own personal fitness program.

Descriptions of assessment tests used for establishing a participants baseline fitness are described within this chapter. **Additional information and specific instructions for performing each assessment should be obtained from the instructor.**

Aerobic Conditioning

[32.01.EO8]

Introduction

An aerobically fit body can deliver required oxygen and nutrients to the working tissues more readily than one that is not aerobically fit.

1.5 mile run

The 1.5 mile run measures a person's aerobic capacity.

- After an appropriate warm-up period, participants run a measured 1.5 mile course as fast as they can
- The runner's time is recorded to the nearest tenth of a second
- After the run, appropriate cool-down procedures should be observed

Beep test

This test is performed over 20 meters. The runner will run the distance in the time allotted between beeps. The time to complete the run gets progressively shorter and shorter. The student will continue until he/she fails to cover the distance in two successive runs.

Continued on next page

1.5 mile run

The following tables identify standard times by percentile.

1.5 Mile Run Test - Standard Times for Females					
Percentile	**Age**				
	20-29	**30-39**	**40-49**	**50-59**	**60+**
99	<9:30	<9:58	<10:09	<11:20	<12:24
95	10:28	11:00	11:33	12:53	14:05
90	11:10	11:33	12:11	13:40	14:53
85	11:33	11:58	12:53	14:24	15:45
80	11:58	12:24	13:23	14:34	16:33
75	12:24	12:53	13:45	15:13	16:46
70	12:51	13:24	13:58	15:43	17:30
65	12:53	13:47	14:34	16:13	17:38
60	13:24	14:08	14:53	16:35	18:27
55	13:48	14:28	15:13	16:46	18:37
50	14:04	14:34	15:34	17:19	19:04
45	14:34	15:14	15:58	17:38	19:35
40	14:50	15:43	16:31	18:18	20:16
35	15:14	15:58	16:46	18:37	20:52
30	15:46	16:42	17:29	19:10	21:36
25	16:21	16:56	18:05	19:43	22:21
20	16:46	17:38	18:37	20:44	22:52
15	17:38	18:37	19:35	21:38	23:37
10	18:33	19:43	20:52	22:52	24:48
5	20:03	21:34	22:22	24:46	26:19
1	>23:58	>24:56	>25:49	>29:09	>30:12

Continued on next page

1.5 mile run (continued)

1.5 Mile Run Test - Standard Times for Males					
Percentile	**Age**				
	20-29	**30-39**	**40-49**	**50-59**	**60+**
99	<8:29	<8:49	<9:10	<9:34	<10:09
95	9:17	9:33	9:51	10:37	11:26
90	9:34	10:01	10:28	11:10	12:20
85	10:00	10:24	10:48	11:45	12:53
80	10:09	10:46	11:15	12:08	13:23
75	10:43	11:06	11:40	12:36	13:52
70	10:59	11:22	11:58	12:53	14:16
65	11:10	11:33	12:11	13:20	14:34
60	11:29	11:54	12:24	13:35	15:04
55	11:41	11:58	12:53	13:58	15:23
50	11:58	12:24	13:12	14:23	15:56
45	12:20	12:50	13:24	14:34	16:21
40	12:38	12:58	13:50	15:06	16:46
35	12:53	13:24	14:11	15:26	17:11
30	13:15	13:44	14:34	15:58	17:41
25	13:36	14:05	14:53	16:28	18:33
20	14:00	14:34	15:24	16:58	19:10
15	14:34	15:13	15:58	17:38	20:19
10	15:30	15:57	16:46	18:37	21:51
5	17:04	17:25	18:48	20:38	24:03
1	>20:58	>20:58	>22:22	>25:00	>29:47

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20-meter multi-stage 'beep' test

The "L" notation in the following tables indicate the highest level completed. The "S" notation indicates the number of shuttles completed beyond the last completed level. For example, "L7,S4" indicates completion of Level 7 and then four more shuttles in Level 8 before stopping.

20-Meter Multi-Stage 'Beep' Test – Females Percentile Norms for Levels and Shuttles Completed*					
Percentile	**Age**				
	20-29	**30-39**	**40-49**	**50-59**	**60+**
99	L12, S2	L11, S6	L11, S4	L9, S11	L8, S8
95	L10, S8	L10, S2	L9, S6	L8, S4	L7, S4
90	L9, S11	L9, S6	L8, S11	L7, S6	L6, S8
85	L9, S6	L9, S2	L8, S4	L7, S2	L6, S4
80	L9, S2	L8, S8	L7, S10	L6, S10	L5, S9
75	L8, S8	L8, S4	L7, S6	L6, S6	L5, S8
70	L8, S4	L7, S8	L7, S4	L6, S4	L5, S5
65	L8, S4	L7, S6	L6, S10	L6, S2	L5, S4
60	L7, S8	L7, S4	L6, S8	L5, S9	L4, S9
55	L7, S6	L7, S2	L6, S6	L5, S6	L4, S8
50	L7, S4	L6, S10	L6, S4	L5, S4	L4, S7
45	L6, S10	L6, S6	L6, S2	L5, S2	L4, S6
40	L6, S8	L6, S4	L5, S9	L4, S9	L4, S3
35	L6, S6	L6, S2	L5, S6	L4, S6	L3, S9
30	L6, S4	L5, S9	L5, S4	L4, S5	L3, S8
25	L5, S9	L5, S6	L5, S2	L4, S4	L3, S6
20	L5, S6	L5, S4	L4, S9	L4, S2	L3, S5
15	L5, S4	L4, S9	L4, S6	L3, S8	L3, S3
10	L4, S9	L4, S6	L4, S2	L3, S5	L3, S1
5	L4, S4	L3, S8	L3, S6	L3, S1	L2, S6
1	L3, S2	L2, S8	L2, S7	L2, S2	L2, S1

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20-meter multi-stage 'beep' test (continued)

20-Meter Multi-Stage 'Beep' Test – Males Percentile Norms for Levels and Shuttles Completed*					
Percentile	**Age**				
	20-29	**30-39**	**40-49**	**50-59**	**60+**
99	L13, S13	L13, S4	L12, S8	L12, S2	L11, S2
95	L12, S6	L12, S2	L11, S8	L10, S6	L9, S8
90	L11, S12	L11, S6	L10, S8	L9, S11	L8, S8
85	L11, S6	L10, S11	L10, S4	L9, S4	L8, S4
80	L11, S4	L10, S4	L9, S11	L8, S11	L5, S8
75	L10, S6	L9, S11	L9, S6	L8, S6	L7, S6
70	L10, S2	L9, S8	L9 S2	L8, S4	L7, S2
65	L9, S11	L9, S6	L8, S11	L7, S10	L6, S10
60	L9, S8	L9, S4	L8, S8	L7, S8	L6, S8
55	L9, S6	L9, S2	L8, S4	L7, S4	L6, S6
50	L9, S2	L8, S9	L7, S10	L7, S2	L6, S2
45	L8, S8	L8, S4	L7, S8	L6, S10	L5, S9
40	L8, S6	L8, S2	L7, S6	L6, S8	L5, S6
35	L8, S4	L7, S10	L7, S4	L6, S6	L5, S4
30	L7, S10	L7, S6	L7, S2	L6, S2	L5, S3
25	L7, S8	L7, S4	L6, S8	L5, S9	L4, S9
20	L7, S4	L7, S2	L6, S6	L5, S6	L4, S7
15	L7, S2	L6, S6	L6, S2	L5, S4	L4, S4
10	L6, S6	L6, S2	L5, S6	L4, S9	L3, S8
5	L5, S6	L5, S4	L4, S9	L4, S2	L3, S3
1	L4, S2	L4, S2	L3, S6	L3, S2	L2, S2

Anaerobic Conditioning

Introduction

Anaerobic conditioning is the body's ability to operate at near maximal intensity over short duration. This improves the underlying abilities required for short foot pursuit performance and/or to overcome and restrain combative suspects.

Anaerobic training

The following table identifies a few types of training that may be used in an anaerobic conditioning program.

Function	Examples of Anaerobic Training
Anaerobic Capacity Test: is the total amount of energy from the anaerobic energy system, which is the combined amount of output for the Anaerobic Training Period (ATP), phospho-creatine and lactic acid systems	- 300m run: long anaerobic test - 30 second Wing Gate Test: a cycle test or arm ergometer of anaerobic leg or arm power, conducted over 30 seconds
Circuit Training: time-efficient but safe alternative to traditional types of moderate long term exercise that utilizes an all-in-one exercise format that works both the heart and the muscles	- Rounds: How many rounds can you complete in 20 minutes? - Time: How much time does it take complete 100 body weight squats? - Repetitions: How many repetitions can you complete in 30 seconds?
Interval Training: incorporates periods of high intensity exercise (work interval) alternating with periods of lower intensity (rest interval). Extreme bouts of interval training can also be defined as High Intensity Interval Training (HIIT)	- 10 x 1 minute on with 1 minute rest - 10 x 30 second sprints with 90 seconds walk - HIIT: 6 x 300 meter sprint / 100 meter walk

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300 Meter run test

The intent of this test is to complete 300 meters in the quickest possible time. Ensure that a good warm-up is conducted before the test, including a jog, dynamic warm-up and some short sprints. To start, participants line up behind the starting line. On the command 'go' the clock will start and they will begin running. The following tables identify standard times by percentile.

300 Meter Run Test - Standard Times for Females					
Percentile	29Age				
	20-29	30-39	40-49	50-59	60+
99	<54.0	<55.0	<65.0	N/A	N/A
95	54.3	56.5	65.0		
90	56.0	60.0	66.0		
85	58.0	63.5	68.2		
80	58.3	66.0	72.0		
75	59.7	66.5	72.0		
70	60.0	68.0	75.3		
65	61.0	69.9	78.7		
60	61.0	71.0	79.0		
55	62.7	72.0	80.5		
50	64.0	74.0	86.0		
45	68.5	75.5	91.7		
40	71.0	79.0	94.0		
35	74.5	80.5	101.8		
30	75.0	82.0	106.7		
25	76.0	85.5	109.3		
20	78.0	86.0	110.0		
15	88.0	93.5	116.0		
10	79.0	100.0	121.5		
5	106.7	114.0	125.0		
1	>120.0	>210.0	>125.0		

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300 Meter run test (continued)

300 Meter Run Test - Standard Times for Males					
Percentile	**29Age**				
	20-29	**20-29**	**20-29**	**20-29**	**60+**
99	<42.6	<42.0	<47.0	52.0	N/A
95	46.0	46.1	52.0	58.0	
90	48.0	49.0	55.0	61.0	
85	49.0	50.0	56.0	63.0	
80	50.3	51.0	57.0	66.4	
75	51.0	52.0	60.0	58.0	
70	52.0	53.0	61.0	70.0	
65	53.5	54.0	62.0	72.0	
60	54.0	55.0	64.0	74.0	
55	55.0	56.0	66.0	77.4	
50	56.0	57.0	67.6	80.0	
45	57.5	58.0	70.0	82.6	
40	59.0	58.9	72.0	83.2	
35	60.0	61.0	74.8	85.0	
30	62.1	63.0	77.0	87.0	
25	64.0	65.0	81.0	89.0	
20	66.0	68.0	83.0	95.0	
15	69.0	70.0	86.0	99.0	
10	73.4	74.9	90.0	101.6	
5	81.3	80.9	104.0	112.0	
1	>95.1	>113.9	>143.0	>184.0	

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Muscular Strength

Introduction

Muscular strength is the ability to lift a maximal amount of weight for one repetition (1RM). In order to improve muscular strength, lifting heavy amounts of weight will be beneficial to job related tasks. Strength builds the foundation for all other athletic qualities. The stronger the muscles become the more forceful the contractions, the faster the participants will run, the higher they will jump, and the further they will throw/kick.

Power conditioning program

The following table identifies different methods that may be used in a power conditioning program.

Function / Body Area	Examples of Exercises
Squats	- Deadlift - Back Squat - Lunge - Step Up
Pull	- Pull Up / Chin Up - Plank Row - Lat Pulldown - Bent Over Row
Push	- Bench Press - Overhead Press - Military Press - Incline Press

Continued on next page

Muscular Strength, Continued

Bench press test

This assessment uses a bench press with standard Olympic bar and free weights to determine the student's muscular strength.

- Participants lie on the padded weight bench in a supine, face-up position **SPOTTERS ARE REQUIRED**
- A reasonable time is allowed to warm-up
- The bar has to touch the person's chest and pause on the chest. Shoulders, head, and buttocks must remain on the bench and feet must remain on the floor at all times during the lift. Arms must lock out at the top of the lift
- The score is the maximum weight pressed/body weight

Continued on next page

Bench press test (continued)

The following table identifies the standards by percentage.

Bench Press Test - Standard Weight Pressed/Body Weight for Females					
Percentile	**Age**				
	20-29	**30-39**	**40-49**	**50-59**	**60+**
99	>1.01	>.82	>.77	>.68	>.72
95	1.01	.82	.77	.68	.72
90	.90	.76	.71	.61	.64
85	.83	.72	.66	.57	.59
80	.80	.70	.62	.55	.54
75	.77	.65	.60	.53	.53
70	.74	.63	.57	.52	.51
65	.72	.62	.55	.50	.48
60	.70	.60	.54	.48	.47
55	.68	.58	.53	.47	.46
50	.65	.57	.52	.46	.45
45	.63	.55	.51	.45	.44
40	.59	.53	.50	.44	.43
35	.58	.52	.48	.43	.41
30	.56	.51	.47	.42	.40
25	.53	.49	.45	.41	.39
20	.51	.47	.43	.39	.38
15	.50	.45	.42	.38	.36
10	.48	.42	.38	.37	.33
5	.44	.39	.35	.31	.26
1	<.44	<.39	<.35	<.31	<.26

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Bench press test (continued)

Bench Press Test - Standard Weight Pressed/Body Weight for Males					
Percentile	**Age**				
	20-29	**30-39**	**40-49**	**50-59**	**60+**
99	>1.63	>1.35	>1.20	>1.05	>.94
95	1.63	1.35	1.20	1.05	.94
90	1.48	1.24	1.10	.97	.89
85	1.37	1.17	1.04	.93	.84
80	1.32	1.12	1.00	.90	.82
75	1.26	1.08	.96	.87	.79
70	1.22	1.04	.93	.84	.77
65	1.18	1.01	.90	.81	.74
60	1.14	.98	.88	.79	.72
55	1.10	.96	.86	.77	.70
50	1.06	.93	.84	.75	.68
45	1.03	.90	.82	.73	.67
40	.99	.88	.80	.71	.66
35	.96	.86	.78	.70	.65
30	.93	.83	.76	.68	.63
25	.90	.81	.74	.66	.60
20	.88	.78	.72	.63	.57
15	.84	.75	.69	.60	.56
10	.80	.71	.65	.57	53
5	.72	.65	.59	.53	.49
1	<.72	<.65	<.59	<.53	<.49

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Muscular Power

Introduction

Muscular power is the ability of a muscle or group to produce maximal power in a quick burst of energy (plyometric jumps, punches, throw etc.).

Power conditioning

Power conditioning enables an athlete to apply the greatest amount of their maximal strength in the shortest period of time. This is crucial for many peace officers who will rarely be required nor have the time to produce maximal forces. An officer can be exceptionally strong but lack significant explosive power if they are unable to apply their strength rapidly. Most law enforcement activities involve far faster movements and far higher power outputs than are found in maximal strength exercises.

The following table identifies a different method that may be used in a power conditioning program.

Function	Examples of Power Exercises
Olympic Weightlifting: explosive lifting stresses the neuromuscular system which teaches the body to fire all the muscle fibers at once thereby enhancing coordination, range of motion, and muscle control	- Hang Clean - Hang Snatch - Power Clean - Power Snatch
Ballistic: force far outweighs the resistance so movement is of a high velocity. The goal is to reach peak acceleration at the moment of release projecting the object or body as far as possible	- Medicine Ball Slam - Jump Squat - Medicine Ball Overhead Toss - Sitting Medicine Ball Chest Pass

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Power conditioning (continued)

Function	Examples of Power Exercises
Plyometrics: involve a quick, powerful movement using a pre-stretch or counter-movement that involves the stretch shortening cycle	- Vertical Jump - Tuck Jumps - Split Squat Jumps - Box Jumps - Bounding - Clap Push Ups

Vertical jump

The student stands with his/her side to a wall and reaches up with the hand closest to the wall, keeping the feet flat on the ground; the point of the fingertips is marked or recorded. This is called the standing reach height. The student then stands away from the wall, and leaps vertically as high as possible using both arms and legs to assist in projecting the body upwards. The jumping technique can or cannot use a countermovement. The student will then attempt to touch the wall at the highest point of the jump. The difference in distance between the standing reach height and the jump height is the score. The best of three attempts is recorded.

Continued on next page

Vertical jump (continued)

The following table identifies the standards by percentage.

Vertical Jump Test - Standard for Females					
Percentile	**Age**				
	20-29	**30-39**	**40-49**	**50-59**	**60+**
99	>19.0	>18.0	>13.5	N/A	N/A
95	18.8	16.9	13.5		
90	18.1	16.0	13.3		
85	17.7	15.0	13.0		
80	17.0	15.0	13.0		
75	17.0	15.0	12.7		
70	16.3	14.9	12.3		
65	16.0	14.3	11.6		
60	15.9	13.2	11.5		
55	15.5	13.0	11.1		
50	15.2	12.5	10.0		
45	14.3	12.4	10.0		
40	14.0	12.0	9.6		
35	13.9	12.0	9.0		
30	13.5	11.1	9.0		
25	13.0	11.0	8.5		
20	12.6	11.0	7.8		
15	12.0	10.9	7.1		
10	12.0	10.2	7.0		
5	11.4	9.1	7.0		
1	<11.0	<6.0	<7.0		

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Vertical jump percentile tables (continued)

Vertical Jump Test - Standard for Males					
Percentile	**Age**				
	20-29	**30-39**	**40-49**	**50-59**	**60+**
99	>30.3	>28.4	>25.1	22.0	N/A
95	26.5	25.0	22.0	21.0	
90	25.0	24.0	20.3	19.5	
85	25.0	23.0	19.5	18.0	
80	24.0	22.0	19.0	17.0	
75	23.0	21.0	18.0	16.5	
70	22.5	21.0	18.0	16.0	
65	22.0	20.0	17.0	15.5	
60	21.5	20.0	17.0	15.0	
55	21.0	20.0	16.5	14.5	
50	20.5	19.5	16.0	14.0	
45	20.0	19.0	16.0	14.0	
40	20.0	18.6	15.5	13.5	
35	19.0	18.5	15.0	13.5	
30	18.0	18.0	14.5	13.0	
25	18.0	17.0	14.0	12.2	
20	17.5	16.5	14.0	11.9	
15	17.0	16.0	13.0	11.0	
10	16.0	15.5	12.1	10.0	
5	13.6	14.5	11.0	9.3	
1	<10.3	<12.1	<6.9	6.5	

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Muscular Endurance

Introduction

Muscular endurance is determined by the number of times a specified muscle can contract before it fatigues. There are three basic muscular endurance assessment methods accepted by POST.

Push-up test

The push-up test measures the dynamic strength and endurance of the arm, chest and shoulder muscles. Students perform as many correct push-ups within one minute.

Anyone who suffers from lower back problems should not perform this test.

Push-ups must be done in proper form:

- The hands are placed slightly wider than shoulder width apart, with fingers pointing forward. The trainer places one fist on the floor below the subject's chest. Either a fist or a 3-inch sponge should be placed under the sternum.
- Starting from the up position (elbows extended), the student must keep the back straight at all times and lower the body to the floor until the chest touches the fist or sponge. The student then returns to the up position.
- Resting should be done only in the up position. Both hands and feet must remain in contact with the floor at all times.
- The total number of correct push-ups in 1 minute is recorded as the score.

Continued on next page

Push-up test (continued)

The following table identifies the standards by percentage.

Push-up Test - Standard Number of Push-ups for Females					
Percentile	**Age**				
	20-29	**30-39**	**40-49**	**50-59**	**60+**
99	53.0	48.0	23.0	N/A	N/A
95	42.0	39.5	20.0		
90	37.0	33.0	18.0		
85	33.0	26.0	17.0		
80	28.0	23.0	15.0		
75	27.0	19.0	15.0		
70	24.0	18.0	14.0		
65	23.0	16.0	13.0		
60	21.0	15.0	13.0		
55	19.0	14.0	11.0		
50	18.0	14.0	11.0		
45	17.0	13.0	10.0		
40	15.0	11.0	9.0		
35	14.0	10.0	8.0		
30	13.0	9.0	7.0		
25	11.0	9.0	7.0		
20	10.0	8.0	6.0		
15	9.0	6.5	5.0		
10	8.0	6.0	4.0		
5	6.0	4.0	1.0		
1	3.0	1.0	0.0		

Continued on next page

Push-up test (continued)

Push-up Test - Standard Number of Push-ups for Males					
Percentile	**Age**				
	20-29	**30-39**	**40-49**	**50-59**	**60+**
99	100	64	51	39	39
95	62	52	40	39	28
90	57	46	36	30	26
85	51	41	34	28	24
80	47	39	30	25	23
75	44	36	29	24	22
70	41	34	26	21	21
65	39	31	25	20	20
60	37	30	24	19	18
55	35	29	22	17	16
50	33	27	21	15	15
45	31	25	19	14	12
40	29	24	18	13	10
35	27	21	16	11	9
30	26	20	15	10	8
25	24	19	13	9.5	7
20	22	17	11	9	6
15	19	15	10	7	5
10	18	13	9	6	4
5	13	9	5	3	2

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Muscular Endurance, Continued

Bent knee sit-ups

Another accepted test for muscular endurance is the bent knee sit-up test. Students must perform as many sit-ups as possible in one minute.

Anyone who suffers from lower back problems should not perform this test.

- The student starts by lying on the back, knees bent, heels flat on the floor, with the fingers laced and held behind the head. Avoid pulling on the head with the hands. The buttocks must remain on the floor with no thrusting of the hips.
- Another student holds the feet down firmly.
- The student then performs as many correct sit-ups as possible in one minute.
- In the up position, the student should touch elbows or break the plane of the knees and then return until the shoulder blades touch the floor.
- Score is total number of correct sit-ups. Any resting will be done in the up position.
- Breathing should be as normal as possible, making sure the student does not hold their breath.
- Neck remains in the neutral position.

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Muscular Endurance, Continued

Bent knee sit-ups

The following table identifies the standards by percentage.

Bent Knee Sit-up Test - Standard Number of Push-ups for Females					
Percentile	**Age**				
	20-29	**30-39**	**40-49**	**50-59**	**60+**
99	>51.0	>42.0	>29.0	>30.0	>28.0
95	51.0	42.0	38.0	30.0	28.0
90	49.0	40.0	34.0	29.0	26.0
85	45.0	38.0	32.0	25.0	20.0
80	44.0	35.0	29.0	24.0	17.0
75	42.0	33.0	28.0	22.0	15.0
70	51.0	32.0	27.0	22.0	12.0
65	29.0	30.0	25.0	21.0	12.0
60	38.0	29.0	24.0	20.0	11.0
55	37.0	28.0	23.0	19.0	10.0
50	35.0	27.0	22.0	17.0	8.0
45	34.0	26.0	21.0	16.0	8.0
40	32.0	25.0	20.0	14.0	6.0
35	31.0	24.0	19.0	12.0	5.0
30	30.0	22.0	17.0	12.0	4.0
25	28.0	21.0	16.0	11.0	4.0
20	24.0	20.0	14.0	10.0	3.0
15	23.0	18.0	13.0	7.0	2.0
10	21.0	15.0	10.0	6.0	1.0
5	18.0	11.0	7.0	5.0	0.0
1	<18.0	<11.0	<7.0	<5.0	0.0

Continued on next page

Bent knee sit-ups (continued)

Bent Knee Sit-up Test - Standard Number of Push-ups for Males					
Percentile	**Age**				
	20-29	**30-39**	**40-49**	**50-59**	**60+**
95	>55.0	>21.0	>47.0	>43.0	>39.0
90	55.0	51.0	47.0	43.0	39.0
85	52.0	48.0	43.0	39.0	35.0
80	49.0	45.0	40.0	36.0	31.0
75	47.0	43.0	39.0	35.0	30.0
70	46.0	42.0	37.0	33.0	28.0
65	45.0	41.0	36.0	31.0	26.0
60	44.0	40.0	35.0	30.0	24.0
55	42.0	39.0	34.0	28.0	22.0
50	41.0	37.0	32.0	27.0	21.0
45	40.0	36.0	31.0	26.0	20.0
40	39.0	36.0	30.0	25.0	19.0
35	38.0	35.0	39.0	24.0	19.0
30	37.0	33.0	28.0	22.0	18.0
25	35.0	32.0	27.0	21.0	17.0
20	35.0	31.0	26.0	20.0	16.0
15	33.0	30.0	24.0	19.0	15.0
10	32.0	28.0	22.0	17.0	13.0
5	30.0	26.0	22.0	15.0	10.0
1	<27.0	<23.0	<17.0	<12.0	<7.0

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Flexibility/Stability/Mobility

Introduction

Flexibility is the ability to move the body through a full range of motion. Flexibility can be measured with a sit and reach test.

Stability is the ability to maintain balance. Officers must have adequate strength to support the body, and they must be able to shift the weight quickly into the correct position at the right time. They must also know their position in space, called "kinesthetic awareness" as well as possess quick reactions, coordination, agility, and flexibility.

Mobility is the ability to actively move your joints. This movement increases lubrication and therefore helps the joints heal. It restores posture and improves your movements as control over the nervous system is re-enforced. Joint mobility should be looked upon as general maintenance for your body.

Flexibility sit and reach test

The sit and reach test measures the flexibility of the muscles in a student's lower back and hamstrings.

- Students are seated with their legs fully extended and the soles of their feet flat against the side of a sit and reach box, with the toes pointed to the ceiling
- Knees should not be bent. Back of knees must remain on floor
- From this position, students extend their hands (with one hand over the other) as far forward as possible on top of the box
- Exhaling on the reach is recommended
- Students must hold this position for one second
- Three trials are permitted and the best score is recorded

Continued on next page

Flexibility sit and reach test (continued)

The following tables identify the standard percentiles.

Sit and Reach Test - Standard Number of Inches for Females					
Percentile	**Age**				
	20-29	**30-39**	**40-49**	**50-59**	**60+**
99	>24.5	>24.0	>22.8	>23.0	>23.0
95	24.5	24.0	22.8	23.0	23.0
90	23.8	22.5	21.5	21.5	21.8
85	23.0	22.0	21.3	21.0	19.5
80	22.5	21.5	20.5	20.3	19.0
75	22.0	21.0	20.0	20.0	18.0
70	21.5	20.5	19.8	19.3	17.5
65	21.0	20.3	19.1	19.0	17.5
60	20.5	20.0	19.0	18.5	17.0
55	20.3	19.5	18.5	18.0	17.0
50	20.0	19.0	18.0	17.9	16.4
45	19.5	18.5	18.0	17.0	16.1
40	19.3	18.3	17.3	16.8	15.5
35	19.0	17.8	17.0	16.0	15.2
30	18.3	17.3	16.5	15.5	14.4
25	17.8	16.8	16.0	15.3	13.6
20	17.0	16.5	15.0	14.8	13.0
15	16.4	15.5	14.0	14.0	11.5
10	15.4	14.4	13.0	13.0	11.5
5	14.1	12.0	10.5	12.3	9.2
1	<14.1	<12.0	<10.5	<12.3	<9.2

Continued on next page

Flexibility sit and reach test (continued)

Sit and Reach Test - Standard Number of Inches for Males					
Percentile	**Age**				
	20-29	**30-39**	**40-49**	**50-59**	**60+**
99	>23.0	>22.0	>21.3	>20.5	>20.0
95	23.0	22.0	21.3	20.5	20.0
90	21.8	21.0	20.0	19.0	19.0
85	21.0	20.0	19.3	18.3	18.0
80	20.5	19.5	18.5	17.5	17.3
75	20.0	19.0	18.0	17.0	16.5
70	19.5	18.5	17.5	16.5	15.5
65	19.0	18.0	17.0	16.0	15.0
60	18.5	17.5	16.3	15.5	14.5
55	18.0	17.0	16.0	15.0	14.0
50	17.5	16.5	15.3	14.5	13.5
45	17.0	16.0	15.0	14.0	13.0
40	16.5	15.5	14.3	13.3	12.5
35	16.0	15.0	14.0	12.5	12.0
30	15.5	14.5	13.3	12.0	11.3
25	15.0	13.8	12.5	11.2	10.5
20	14.4	13.0	12.0	10.5	10.0
15	13.5	12.0	11.0	9.7	9.0
10	12.3	11.0	10.0	8.5	8.0
5	10.5	9.3	8.3	7.0	5.8
1	<10.5	<9.3	<8.3	<7.0	<5.8

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Flexibility/Stability/Mobility, Continued

Flexibility

Flexibility is the ability to move a body part (usually a joint or limb) through a full range of motion (ROM)

Stretching methods

The following chart identifies three common stretching methods.

Function	Examples of Flexibility
Dynamic: functional based exercises which use sport specific movements to prepare the body for movement	• Jumping Jacks • Arm Circles • Leg Swings • Burpees • Lunges
Static: involves gradually easing into the stretch position and holding the position	• Sitting Hamstring Stretch • Quad Stretch • Calf Stretch • Piriformis Stretch • Pectoral Stretch
Yoga: positions that coordinate breath with movement and with holding the position to stretch and strengthen different parts of the body	• Downward facing dog • Lunge with Quad Stretch • Lunge with Side Stretch

Continued on next page

Flexibility/Stability/Mobility, Continued

Stability

- Plank variations
- Yoga style positions (Single leg and arm positions)
- Ball exercises
- Band work

Mobility

- Ankle bending (forward and to the inside and outside)
- Hip circles (leg to the front, back and sides, circling in both directions)
- Cross-over lunge (one leg lunges back, crossing behind, hips rotating)
- Step-overs (lift leg high enough to step over a hurdle from the side and front)
- Thoracic spine (upper/mid-back backwards, then chest up, scapula back)

Joint	Mobile
Gleno-Humeral Joint	Stable
Scapula	Stable
Thoracic Spine	Mobile
Lumbar Spine	Stable
Hips	Mobile
Knee	Stable
Ankle	Mobile
Foot	Stable

Core

Core conditioning

Core conditioning targets the body area between the chest and mid-thigh. The core must be strong and stable to support movement and transmit forces during real-world task performance. Core conditioning must be focused on the following:

- Stability in the lumbar/abdominal area
- Ability to resist rotation while transmitting force
- Mobility in the hip/thoracic spine area

Core conditioning should be included in the warm-up and conditioning periods as a priority of daily training. The following table identifies a few exercises that may be used in a core conditioning program.

Function / Body Area	Examples of Core Exercises
Lumbar and Abdominal Stability	• McGill Sit-Up • Supermans • Parachutes • Bird Dogs
Ability to Resist Rotation	• Chops downward diagonal plane movements with a pillar core • Lifts – upward diagonal plane movements with a pillar core • Twists – side to side movements with a pillar core
Hip and Thoracic Mobility	• Pretzel Stretch (on ground) or Desk Stretch • Lunge Stretch • Lunge Reach Back Stretch • Super Stretch • Dynamic Arm X's • Stick Drill

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Acceleration and Agility

Acceleration conditioning

Acceleration conditioning concentrates on developing the officers "first step" or rapid response. Acceleration drills challenge both your muscular system and nervous system to function in tandem and with precision, allowing you to move faster and under control.

The following table identifies a few types of training that may be used in an acceleration conditioning program.

Function	Examples of Acceleration Training
Movement Drills	• Standing Starts • Standing Broad Jump • Laying (supine / prone) to sprint
Base Drills	• Wall Drills - Walk • Wall Drills - March • Wall Drill - Rapid Fire
Resistance Drills	• Weighted Sled • Parachute • Bungee • Harness

Agility conditioning

Defined by the ability to explosively start, decelerate, change direction, and accelerate again quickly while maintaining body control and minimizing a reduction in speed. Most job specific tasks utilize agility which occur in less than 10 seconds and involve the ability to coordinate a few or several job specific tasks simultaneously. Peace officers inherently require changes of direction in which lateral movements are used in several planes of movement simultaneously.

Continued on next page

Agility conditioning (continued)

The following table identifies a few types of training that may be used in a recovery program.

Function	Examples of Recovery
Basic	• Jump Rope • Jumping Jacks • Long Striders • Split jacks
Multi-Directional	• Cone Drill • Square Drill • Figure Eight Drill • Agility T Drill
Linear / Lateral	• Ladders • Hurdles • Sprint Forward / Backpedal • Zig Zag

Body Composition vs. Performance

Introduction

There are informal body composition self-assessments recommended for peace officers. There are also formal assessments which require specific training to perform.

Maintaining recommended body fat percentage can significantly reduce the risk disablers.

Excess fat can impede mobility, acceleration, agility, and speed.

Excess fat can increase the likelihood of heat disorders (i.e., heat cramps, heat exhaustion, heat stroke) by decreasing the ability of the body to dissipate heat.

Everyone needs essential fat. Extreme body fat loss can result in reduced lean weight including muscle and blood volume which can result in reduced performance.

Assessment methods

There are methods that can be used to assess body fat percentage. However, these require more training and skill to perform and can be costly.

The following table identifies informal assessment methods.

Test	Description
Bioelectrical Impedance	• A "*slight*" electrical current is sent through a person's body • Since body fat is less conductive (i.e., a better insulator) than lean tissue, the rate at which the electricity is conducted through the body is an indicator of the amount of body fat • The conduction rate through the body can be compared to known standards to determine the person's percentile ratings for body fat

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Body Composition vs. Performance, Continued

Assessment methods (continued)

Test	Description
Skinfold Calipers	• The skinfold caliper assessment estimates the percentage of body fat by measuring the thickness of the layer of fat beneath the skin in three different locations on the body • For females, measurements are taken at the triceps, supra iliac (hip), and thigh • For males, measurements are taken at the chest, abdomen, and thigh

Recovery

Introduction

Recovery is the period of time immediately after exercise and prior to the next bout of exercise. Intended for muscle and metabolic recovery, and adaptation.

General recovery

- Recovery from exercise is just as important to physical conditioning as the exercise itself
- Exercise is the stimulus for the body to adapt or respond to training
- Recovery is the time the body actually adapts
- Timely nutrition, including hydration, can accelerate recovery and prepare the individual for the next exercise session

Active recovery

As an exercise session nears conclusion, the student should taper off the intensity of the activity. This recovery period gradually decreases an exercising heart to 100 beats per minute or below and lowers body temperature.

Walking 5 minutes after running is a good example of an active recovery. Recovery between sets, repetitions and intervals may require rest periods.

Methods

Recovery can include, but is not limited to:

- Continuation of exercise activity at a lower intensity (i.e., run/jog/walk)
- Nutrition/hydration
- Massage
- Stretching
- Yoga
- Rest/sleep

Continued on next page

Recovery, Continued

Methods (continued)

The following table identifies a few types of training that may be used in a recovery program.

Function	Examples of Recovery
Immediate Post Recovery Strategies *(30 minutes post training)*	• Restore Fluid • Ingest CHO & Protein • Static Stretching • Put your legs up for 5 minutes
Post Recovery Strategies *(1-3 hours post training)*	• Contrast Showers (30 second on/off) x 5 • Cold Showers • Refueling with a meal within 60 minutes • Light Stretching
Long Term Recovery Strategies *(3+ hours post training)*	• Hydrotherapy (spa, float, pool) • Foam Roller • Bath (ice or hot) • Sleep • Relaxation, Meditation, Massage

Developing a Personal Fitness Program

[32.01.EO13]

Introduction

Once students have established baseline measures for the seven personal physical fitness components, they are ready to develop personal fitness programs. Each student's ultimate goal when designing a fitness program should be to either improve upon or maintain current levels of fitness.

Benefits

There are many benefits for implementing the seven physical fitness components into an exercise program.

A well designed personal physical fitness program can strengthen or improve:

- Cardiovascular
  - Aerobic
  - Anaerobic
- Muscular
  - Strength
  - Power
  - Endurance
- Flexibility/Stability/Mobility
- Core
- Acceleration and agility
- Body composition vs. performance
- Recovery

In addition to the above the following may improve:

- posture
- personal appearance
- your risk profile for chronic diseases including heart disease, cancer, stroke, high blood pressure, lung disease, and arthritis, among others
- Tension relief and the ability to cope with stress

Along with these specific benefits students should consider that most people report that they feel better when they exercise regularly.

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Developing a Personal Fitness Program, Continued

Cardiovascular endurance

A person's heart rate can be used to check and establish appropriate exercise intensity.

Aerobic activity

An **aerobic activity** is any rhythmic activity, which uses large muscle groups, is of sufficient intensity, and can be sustained for at least 20 minutes. The assessments of cardiovascular endurance require students to perform an aerobic activity over a period of time.

Anaerobic activity

An **anaerobic activity** promotes strength, speed, and power. Muscle energy systems trained using anaerobic exercise leads to greater performance in short duration high intensity activities, which last from seconds up to about two minutes.

Cardiovascular endurance: calculating a resting heart rate

Before calculating a training heart rate, officers must know their resting heart rate. The following table describes how officers can measure their own resting heart rates.

Step	Action
1	• Sit quietly for at least five minutes before beginning
2	• Locate radial (wrist) or carotid (neck pulse) • Students should be careful not to touch both carotid arteries at the same time
3	• Count the number of the radial or carotid pulses during a 10 second period of time • Count 0,1,2,3 and so on, making sure to start count at zero, not one
4	• Multiply 10 second pulse by 6 to determine a resting heart rate in beats per minute

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Developing a Personal Fitness Program, Continued

Cardiovascular endurance: calculating a training range

Once students have determined their individual resting heart rates, they can calculate an acceptable **training heart rate range.**

The following table describes the steps in calculating a student's training heart rate range.

Step	Action	Example for 40 year old officer with a resting heart rate of 70 beats per minute
1	Calculate estimated maximum heart rate by subtracting your age from 220	220 - 40 = 180
2	Subtract your resting heart rate	180 - 70 = 110
3	Multiply this number by 70% (.70) for lower end of conditioning range	110 x 70% = 77
4	Add your resting heart rate	77+ 70 = 147 beats per minute
5	Divide by 6 to get your 10 second value (to be used during exercise)	147 ÷ 6 = **25 beats in 10 seconds** (rounded up)
6	Repeat steps 3-5 using 85% for upper end of conditioning range	110 x 85% = 94 (rounded up) 94 + 70 = 164 beats per minute 164 ÷ 6 = **27 beats in 10 seconds**
The training heart rate range for this person would be 25 - 27 beats in 10 seconds.		

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Developing a Personal Fitness Program, Continued

Training zones

Heart Rate Chart
Zone

1	60 – 70%	Recovery
2	70 – 85%	Aerobic
3	85 – 90%	Anaerobic
4	90 – 100%	VO2 Max

Exertion ratings

Rating of Perceived Exertion Scale

Rating	**Description**
0	Nothing at all
0.5	Very, very light
1	Very light
2	Fairly light
3	Moderate
4	Somewhat hard
5	Hard
6	Hard
7	Very hard
8	Very hard
9	Very hard
10	Very, very hard (maximum)

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Cardiovascular endurance: calculating training heart rate

Comparing an actual heart rate during exercise with students training heart rate range will help them determine an appropriate exercise pace for improving cardiovascular fitness.

A heart rate is usually expressed in beats per minute. However, it is impractical to measure a heart rate for an entire minute during exercise. Also, the heart rate begins to drop as soon as the student stops exercising. Because of this, training heart rate range calculations are made for a *10 second period*.

Students should measure their actual training heart rate after a "steady state" is reached. This means that pulse should be checked after at least five minutes of aerobic activity. The table below describes the steps students should take in measuring their actual training heart rate.

Step	Action
1	• Find the pulse in the wrist or carotid artery *while still exercising*
2	• Stop briefly and begin counting the pulse for a 10 second period, using a watch for the time • Count 0, 1, 2, 3 and so on, making sure to start count at zero, not one
3	• Compare the student's own training heart rate range

NOTE: Student's should begin counting their pulse as soon as possible after stopping exercise for measurement. Measurements beyond a 10 second period can also cause error.

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Enhancing cardiovascular endurance

Training heart rate range for cardiovascular (aerobic) exercise is considered to be between 70% and 85% of a student's capacity. The following table identifies how students can use their own training heart rate to improve performance.

IF the student's heart rate during aerobic exercise is…	**THEN…**
below the lower end of training range,	• gains from the activity will be minimal • the student should increase the pace of the activity
above the upper end of the training range,	• it may become difficult to sustain exercise for an appropriate length of time and the student may be more susceptible to injury • the student should decrease the pace of the activity
within the training range,	• the student should maintain the current pace of the activity

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Improving cardiovascular endurance

Baseline cardiovascular endurance can be improved with moderate intensity levels of aerobic exercise. The following table describes basic cardiovascular training.

Description	Examples
A program including cardiovascular training should: • require some form of aerobic activity using large muscle groups in a rhythmic activity • continue for at least 20 minutes in the *training heart rate range* • be performed three to five times per week	• Cycling • Jogging • Running • Swimming • Circuits • Intervals • High intensity training • Tabatas

NOTE: Cardiovascular activities enhance muscular endurance, though not necessarily muscular strength. For example, running, which is an aerobic exercise, increases muscular endurance but does not significantly increase the muscular strength of the legs.

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Muscular strength

Strength training involves the use of progressive resistance. Over several sessions of exercise, weight should be added to the lift as the person gains strength.

Progressive resistance increases the amount of force a specific muscle group can exert.

Improving muscular strength

To develop strength, students must work as many muscle fibers at one time as possible by lifting heavy weight for several repetitions. This causes the maximum neurological stimulation of the muscle so that many fibers contract at the same time.

The following table describes recommendations for strength training.

Exercise Recommendations	Examples
• Work all major muscle groups of the body in balance, beginning with the largest muscle group and working to the smallest • For a beginner, perform one exercise per major muscle group. Do three sets of 8-12 repetitions, stopping at the point of temporary muscle failure. This is the point at which the officer cannot do another repetition properly • When the student can exceed the 12-repetition maximum, they should increase the resistance (weight) by 5 percent • Working bi and unilaterally • Train multiple planes	For upper body: • bench press • upright row • biceps curls • triceps extensions • lat pull-down For lower body: • leg press • toe press • leg extensions • hamstring curls • bar bell lunge

NOTE: Though weight-lifting is the generally preferred method of muscular strength training, students without access to a gym should know that both muscular strength and endurance can be improved through a calisthenics program.

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Muscular endurance

Lifting *lighter weights* for a number of repetitions has been shown to develop muscular endurance.

When lighter weights are lifted, fewer muscle fibers contract at one time in an alternating on/off sequence. This allows muscle fibers to recover on the "off "cycle so that the exercise can continue through many repetitions.

Improving muscular endurance

To increase muscular endurance, students should follow the same recommendations as for improving muscular strength -- but with *lighter weights*.

Calisthenics programs using a person's own body weight for resistance can also be used to improve muscular endurance. The following table identifies a number of exercises that may be used in a calisthenics program.

Body Area	Examples of Callisthenic Exercises
Upper body	• Push-ups • Pull-ups/chin-ups • Bar dips • Jumping jacks • Burpees • Mountain climb • Air squats
Muscular power	• Jumps • Throws • Bench press • Power cleans • Medicine ball slams

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Improving muscular endurance (continued)

Body Area	Examples of Calisthenics Exercises
Trunk	• Crunches • Reverse sit-ups • Back extensions • Front and side planks • Supermans • Bird dogs
Lower body	• Leg lunges • Leg lifts for inner and outer thigh • Air squats • Step-ups

NOTE: Strength training exercises may increase muscular endurance.

Flexibility

Not all individuals will be equally flexible, even when in good physical condition. There are a number of natural factors that affect joint flexibility, including:

- The bone structure of the joint
- Bulk of muscle close to the joint
- Normal tension of the surrounding muscles
- Pliability of connective tissue
- The structure of ligaments and tissues

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Improving flexibility

There are two stretching strategies: dynamic and static stretching. All warm-up activities are designed to increase the core temperature and blood flow to target muscles.

Dynamic stretching involves a repeated stretching technique that will increase the range of motion. Movement preparation specific to physical conditioning.

In a static stretch, the student gradually applies increased tension across a major movable joint of the body, without reaching the point of pain. This stretch should be sustained for 20-40 seconds. Hold time can increase as the training program progresses. This is generally the more accepted form of stretching after the exercise session.

When employing a stretching program to improve flexibility, students should:

- use gentle stretch-and-hold movements followed by relaxation
- avoid bouncing, jerking, or quick moving exercises that could lead to injuries
- remember that a sense of pain while stretching means that muscles are overstretched and the exercises may be doing more harm than good

NOTE: In addition to increasing flexibility, stretching principles can help reduce injuries in occupational activities, sports, recreational activities, and other exercise activities.

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Stability

Stability is the ability to maintain balance. Officers must have adequate strength to support the body, and they must be able to shift the weight quickly into the correct position at the right time. They must also know their position in space, called "kinesthetic awareness", as well as possess quick reactions, coordination, agility, and flexibility.

Mobility

Mobility is the ability to actively move your joints. This movement increases lubrication and therefore helps the joints heal. It restores posture and improves your movements as control over the nervous system is reinforced. Joint mobility should be looked upon as general maintenance for your body.

Body composition

A combination of good nutrition and regular exercise is the most effective means of controlling body fat and improving body composition. *Neither nutrition nor exercise alone is as effective as the combination of the two.*

Body composition: calorie requirements

The amount of body fat stored in a body depends on the number of calories taken in (nutrition) and the number of calories expended (activity). When calorie intake is higher than expenditure, the excess is stored as fat. When expenditure is higher than the intake, the body breaks down and uses stored fat.

To balance nutrition and activity students need to know the following requirements:

- A moderately active male of average size requires approximately 2,800 calories a day to maintain his weight
- A moderately active female of average size requires approximately 2,100 calories a day to maintain her weight
- 3,500 food calories equal one pound of body weight. Based on this, to lose two pounds a week (just by limiting calories with no increase in activity), a person would have to reduce daily calorie intake by 1,000 calories

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Body composition: activity

A combination of proper nutrition and exercise is the optimal strategy for controlling or improving body composition. The best types of physical activity for optimizing body composition are aerobic exercise and strength training.

The benefits of both aerobic and weight training on body composition are noted in the following table.

Benefits of Aerobics	Benefits of Strength Training
• Aerobic activity relies primarily on a combination of carbohydrates and fat for fuel • Aerobic activities produce metabolic changes (raise metabolism) when performed regularly over a period of time • Aerobic activity results in increased fat burning not only while exercising but also while at rest • Aerobic capacity is easy to improve by lengthening the duration and/or increasing frequency of the workouts	• Strength training, such as weight lifting, can dramatically increase muscle and bone mass • As lean body mass increases, the body's metabolism will increase • As the muscles get larger they burn more calories

Principles of Physical Conditioning

[32.01.EO14]

Basic principles

Physical conditioning is the systematic application of seven key principles to an officer's training activities in order to improve; cardiovascular, muscular, flexibility/mobility, core, acceleration and agility, body composition vs. performance and recovery.

Physical conditioning principles are primarily applied to aerobic exercise and strength training activities. The seven basic principles of physical conditioning are the following.

- Specificity
- Frequency
- Intensity
- Volume
- Active recovery
- Periodization/program design
    - Foundational phase
    - Conditioning phase
    - Peak performance phase
- Progression

Specificity

Specificity entails selecting an exercise activity that matches the chosen performance goal.

Key Points	Example
• The body will respond specifically to the type of work it is forced to do • Exercises should be chosen to prepare officers for the activities in which they will engage	• Riding a stationary bike will increase cardiovascular endurance, but will not totally prepare the officer to run a foot race • Sprint work will increase cardiovascular capacity and will better prepare the officer for short foot pursuits

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Principles of Physical Conditioning, Continued

Frequency

Frequency refers to how often exercise sessions occur in a given week.

Key Points	Example
• The current recommendation is three to five sessions of cardiovascular activity per week • The *minimum* number of recommended sessions per week for physical conditioning should be three • Intervening rest between exercise sessions is important for body recovery. **Too little rest can result in overtraining and injury** • For strength training, 48 hours of rest between sessions for the same muscle group is recommended	• An officer runs 5 miles Monday, Wednesday, and Friday each week for cardiovascular endurance and lifts weights for strength training Tuesdays, Thursdays and Saturdays. This allows a minimum of two days recovery before the same activity is attempted again

Intensity

Intensity refers to the stress level at which a person is exercising. Intensity includes the speed or pace of an exercise to obtain the training heart rate.

Key Points	Example
• Intensity is usually monitored by using heart rate or by counting the number of exercise repetitions performed during a fixed time interval • For conditioning, a person should increase the intensity level of exercise as their individual physical capability increases	• A person who increases their training heart rate from 70 to 85 percent of their maximum heart rate while riding a stationary bicycle is increasing the intensity of the exercise • A person who cuts a minute off the running time of the 5 mile run is increasing the intensity of the exercise

NOTE: When increasing intensity, participants should be careful not to exceed their maximum heart rate (220 beats per minute minus their age).

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Principles of Physical Conditioning, Continued

Volume

Volume refers to the amount of time/load devoted to the training phase of exercise. It does not include warm-up and recovery.

Key Points	Example
• For cardiovascular training, the general recommendation is 20-60 minutes per session with 20 being the minimum	• A person who runs at a training heart rate of 95 percent of maximum can only sustain this for a brief duration, less than the recommended minimum of 20 minutes. By lowering the intensity to 70 percent of maximum, he can run for a longer duration, 40 minutes, falling well within the recommended duration for aerobic conditioning

Active recovery

Recovery betweens sets, repetitions, and intervals may require rest, which is commonly referred to as active recovery.

Periodization /program design

Periodization/Program Design is the organization of training into basic workable units. For adaptation to occur, the body must be exercised at a level above what it is normally accustomed to. An organized approach to training that involves varying a training program at regular time intervals to bring about optimal gains in physical performance benefits to improve muscular endurance, strength, power, motor performance, and/or muscle hypertrophy.

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Periodization /program design (continued)

The basic principle utilized in program design:

- **Frequency:** refers to how often you exercise
- **Intensity:** refers to how hard you exercise
- **Specificity:** to become better at a particular exercise or skill, you must perform that exercise or skill
- **Volume:** refers to the amount of time/load devoted to the training phase
- **Individualization:** goals that are matched to each person's needs
- **Overload Principle:** in order to improve our fitness, strength or endurance, we need to increase the workload *(rule of thumb: No more than 10% of previous week volume)*
- **Adaptation:** the body's ability to adjust to increased or decreased physical demands

The following table identifies different methods that may be used in developing a training program.

Function	Examples of Training Phase
Foundation Phase: general preparatory or general conditioning exercises to strengthen all the major muscles and joints and develop the functional systems of the body such as the cardiovascular and nervous systems	- Volume of training is high - Intensity of training is low - Primary purpose to prepare athletes for more intense and sport-specific training in later phases
Conditioning Phase: very specific to the sport and energy systems	- Volume of training is reduced - Intensity of training is elevated

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Periodization /program design (continued)

Peak Performance Phase: is used to facilitate psychological rest, relaxation and biological regeneration as well as to maintain an acceptable level of general physical preparation	- Intensity is at its highest - Volume lowest point race, competition, or event

Progression

Progression is a gradual and systematic increase of the workload over a period of time. A training principle which suggest that the intensity/duration of exercise should gradually increase over a period of time. This calculated increase in intensity/duration will allow for physiological adaption to occur.

Key Points	Example
• If you want to see results when lifting weights, you have to lift more than your muscles can handle. The progressive overload will cause the muscle fibers to grow stronger and sometimes bigger in order to handle the extra load	• A student performs 1 set of the biceps barbell curl for 20 pounds at 8RM (8 repetitions maximum), but as your training progresses 1 set of 20 pounds for 8 repetitions becomes easier and easier and your biceps size have grown since you first started but they have reached a plateau and stopped getting bigger • In order for the person's biceps muscles to get even bigger and stronger he/she will need to place even more demands on them

Training Sessions

[32.01.EO18, 32.01.EO19]

Introduction

Conditioning is only one component of a complete exercise session. The program must consist of a minimum of 36 sessions. The 36 required sessions must be conducted within a period of 10 to 14 consecutive weeks with a minimum of two sessions per week. Each session must be a minimum of 60 minutes in length. Each session must consist of a warm-up, a training period, and recovery. Each student must participate in a minimum of 30 of the required 36 sessions.

Warm-up period

Every exercise session should begin with a warm-up lasting five to ten minutes. The warm-up serves as a preparation for the actual conditioning session by:

- increasing the muscle and body core temperatures
- increasing blood flow to the working muscles and joints

Since warm-up activities should involve the whole body and cause a gradual increase in the heart rate, a warm-up is recommended even before muscular strength or endurance or flexibility conditioning.

Generally the best warm-up for cardiovascular exercise is the conditioning activity itself performed at a lower intensity.

Training period

Training is the main component of the exercise session. The training phase is tailored to meet specific training objectives cardiovascular, muscular, flexibility/mobility, core, acceleration and agility, body composition vs. performance and recovery.

During the training phase, the chosen activity must be performed at the required intensity and for the required duration to produce desired results.

For example, if the student's goal is to increase cardiovascular endurance, the conditioning period of the exercise session might include circuit training, distance running, swimming, or other aerobic activities. If the goal is muscular endurance, the conditioning period might include weight lifting or calisthenics.

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Training Sessions, Continued

Recovery period

As an exercise session nears conclusion, the student should taper off the intensity of the activity. This recovery period:

- gradually decreases an exercising heart rate to around 100 or 110 beats per minute
- lowers body temperature

The best recovery is the conditioning activity performed at a lower intensity. For example, recovery for a distance run might be a slow jog or a fast paced walking period.

Stretching is optional, but recommended, after the recovery to improve flexibility. Recovery stretches should be static and aimed at the muscle groups targeted in the training phase period (e.g., after running, the stretching should focus on the legs, hips, and lower back).

Safety considerations during training

There is always a risk of injury when a student participates in an exercise program. To minimize this risk, students should follow these guidelines.

- Only perform strenuous exercises in locations with adequate light and ventilation
- Keep drinking water available
- Wear proper clothing and footwear for the activity
- Make sure running surfaces afford reasonable traction, are unbanked, and are free of obvious hazards such as potholes and excessively steep inclines
- Perform calisthenics and aerobics on shock absorbing, nonabrasive surfaces
- Follow proper exercise techniques. Seek advice if you are uncertain about how to perform an activity

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Heat related illnesses

Heat related illnesses can be life threatening. The primary way your body cools itself is by the evaporation of perspiration on your skin.

Heat illnesses become a higher risk when:

- There is a lot of humidity in the air which prevents your perspiration from evaporating (moderate heat with high humidity can be more dangerous than higher but dry heat)

The three types of heat illness are:

- Heat cramps – frequently in lower extremities, (i.e., calves, hamstrings, etc.)
- Heat exhaustion – headaches, nausea, profuse sweating, dizziness
- Heat stroke – neutral confusion and disorientation, robotic gait, no sweating – dry salt crusted skin, red hot dry skin

You are dehydrated due to:

- Drinking fluids with caffeine
- Drinking alcoholic beverages
- Fever, viral infection, diarrhea, etc.

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Heat related illnesses (continued)

Prevention is the key:

- Drink more water, before you are thirsty 4-8 cups of water per hour minimum (take it with you to physical conditioning)
- Beverages with enhanced sodium content are highly encouraged as the fluid of choice during any intense exercise in heat or prolonged event
- Rest frequently in shade
- Recognize symptoms of heat illness and act early
- Avoid drinking caffeine fluids like soda or coffee for four hours prior to exercise
- Avoid drinking alcoholic fluids twelve hours before exercise
- Wear light colored clothing to exercise that breathes in direct sunlight

The first aid for heat illnesses include:

- Heat cramps – stop exercise, get into shade and cooler area, stretch and massage cramping muscle, drink fluids with electrolyte replacement
- Heat exhaustion – stop exercise immediately, get into shade and cooler area, apply ice and/or wet clothes to neck and upper body area, drink electrolyte replacement drinks or water, sit down
- If nauseated, drink water vs. flavored drinks
- Heat Stroke – bring core body temperature down quickly, apply ice packs, wet clothing and remove excess clothing, get into shade and cooler environment immediately, sit or lay down, call paramedics, if conscious give fluids, if not breathing or no pulse, begin CPR

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Training Sessions, Continued

Discomfort vs. pain

Students must learn to recognize the difference between the discomfort that can naturally accompany exercise exertion versus actual pain.

Natural discomfort requires no treatment, i.e., heavy breathing, muscle soreness, heavy perspiration.

Actual pain, however, is a symptom of an injury or other physiological disorder.

Rhabdomyolysis

Rhabdomyolysis is a life threatening, but rare, illness that may occur after a very intense bout of exercise that you are not physically conditioned or prepared to complete. Even very physically fit persons, performing unfamiliar and challenging exercise routines, who push themselves to continue when their body tells them to stop, are susceptible.

Rhabdomyolysis occurs when the muscle cell membranes break down due to damage from doing too much work and their contents (mostly proteins & potassium) leak into the blood stream and then spill over into the urine making it turn brown (like iced tea or "Coca Cola"). This can lead to cardiac arrest, kidney failure requiring dialysis, and permanent muscle damage (prolonged weakness) or actual death of muscle cells requiring surgical removal.

Rhabdomyolysis risks are especially high when you ignore symptoms that your body is going well beyond its present ability. Particularly when you are doing high repetitions, eccentric contraction or "negative reps," and/or new exercise combinations in short time frames. Heat stress and dehydration, viral infection and taking statin drugs may increase risk and/or severity.

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Rhabdomyolysis (continued)

Symptoms to pay attention to:

- Severe muscle soreness
- Swelling
- Brown colored urine
- Muscle weakness
- Feeling of extreme effort and acute exhaustion, out of breath, light headedness

NOTE: Rhabdomyolysis requires immediate emergency medical attention.

Training injuries

There are two types of training injuries. They are acute injuries and chronic injuries.

NOTE: Physiological disorders other than simple training injuries are beyond the scope of this workbook and should be diagnosed by a medical professional.

Acute injuries

Acute injuries are physical injuries resulting from a specific event, mishap, or accident. Examples of acute injuries include sprains, strains, fractures, dislocations, etc.

Acute injuries often occur as fatigue increases and a student's environmental awareness decreases. Fractures or dislocations should receive immediate medical attention. Minor acute injuries such as strains, sprains, or bruises may usually be self-treated.

NOTE: Students should use sound judgment regarding medical attention for minor acute injuries. Physical injuries should be brought to the attention of the training staff.

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Training Sessions, Continued

Chronic injuries

Chronic injuries are usually the consequence of overtraining or overuse. Chronic injuries do not result from one incident. Instead, they result from several exercise sessions when the person does too much too soon or when the body mechanics of the person are abnormal.

Examples of chronic injuries include soft tissue inflammation, shin splints, and tendinitis. These and other chronic injuries can generally be prevented by using an appropriate progression of duration, frequency and intensity during the workout.

NOTE: Chronic injury resulting from abnormal body mechanics should be evaluated by a medical professional.

Self-treatment vs. professional treatment

Many training injuries require only self-treatment; others require professional medical treatment that may include formal medical evaluation, treatment, or physical therapy. There is no hard and fast rule when a person should call a doctor about a training injury.

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Self-treatment vs. professional treatment (continued)

The following table identifies guidelines for determining when medical attention is needed.

A person may attempt self-treatment if:	A person should seek medical attention if there is:
• pain is vague, gradual in the onset, and doesn't limit normal range of movement • pain fitting the above description starts during activity and disappears when activity is stopped • pain fitting the above description starts during activity but goes away after two or three days of rest	• severe or persistent muscle pain, swelling, or spasm • persistent pain is centered in a bone or joint • persistent stiffness, decreased mobility of a joint, or inability to move a joint at all • persistent stabbing or radiating pain • persistent numbness or tingling • a focused pain that limits movement and persists for more than three days in spite of rest and self-care measures

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Self-treatment of injuries

The acronym **RICE** can help a person remember the best approach to follow in self-treating training injuries.

RICE	
Rest	• A person should rest the injured body part because it reduces pain and prevents aggravating the injury
Ice	• Ice is the most effective, safest, and cheapest form of exercise injury treatment • When a person suffers an acute injury such as a torn ligament, muscle strain, or bruise, it is critical to start icing the injury as soon as possible • The ice relieves pain and slows blood flow, reducing internal bleeding and swelling. This helps limit tissue damage and speeds up healing • Ice should be applied for a maximum of 15 minute intervals with breaks in-between
Compression	• Compression and elevation keep excess fluids from accumulating in the injured tissues • Person's can combine ice and compression by holding an ice pack in place with a bandage
Elevation	• The injured body part should be elevated above the person's heart level during rest

NOTE: In addition to these measures a person may use a nonprescription anti-inflammatory drug such as aspirin or ibuprofen.

NOTE: A person should ice exercise injuries even if they will be seeing a doctor immediately. Rapid icing will help speed recovery.

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Using heat

Most sports physicians and trainers recommend using ice for at least the first 48 hours after an injury and then to *try heat only after swelling has subsided.*

Heat stimulates blood flow, and when used properly, heat can:

- help relieve pain
- relax muscles
- reduce joint stiffness

NOTE: When used too soon, however, heat increases inflammation.

Chapter Synopsis

Learning need	Officers need to know how to apply methods for evaluating and managing their physical fitness for a healthy lifestyle necessary for safety and effectively performing peace officer duties.
Elements of personal fitness [32.01.EO7]	Lifetime fitness programs should include an exercise regimen that focuses on increasing and maintaining fitness in seven primary areas.
Cardiovascular endurance [32.01.E08]	The ability of the heart, lungs and blood vessels to deliver adequate amounts of oxygen and nutrients to working cells during prolonged physical activity.
Muscular strength [32.01.E08]	The maximum force that a muscle can exert at one time.
Muscular endurance [32.01.E08]	The number of times a muscle can contract before it fatigues.
Flexibility [32.01.E08]	The ability to move a body part (usually a joint or limb) through a full range of motion.
Body composition [32.01.E08]	The proportion of fat compared with lean tissue in the body.

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Improving personal fitness [32.01.EO13]

Appropriate measures for improving fitness and performance within each of the seven components of a personal fitness program are cardiovascular, muscular, flexibility/mobility, core, acceleration and agility, body composition vs. performance and recovery.

Principles of physical conditioning [32.01.EO14]

Physical conditioning is the systematic application of seven key principles to training activities to improve cardiovascular, muscular, flexibility/mobility, core, acceleration and agility, body composition vs. performance and recovery.

Training session components [32.01.EO18]

In order to reduce injury, a training session should consist of three basic components.

- Warm-up
- Training Phase
- Recovery

Training injuries [32.01.EO19]

There are two types of training injuries:

- Acute
- Chronic

Workbook Learning Activities

Introduction

To help you review and apply the material covered in this chapter, a selection of learning activities has been included. No answers are provided. However, by referring to the appropriate text, you should be able to prepare a response.

Activity questions

1. Officer Thomson runs three times a week for twenty minutes at a pace of seven minutes per mile. Officer Perez runs five times a week for forty minutes at a rate of nine minutes per mile. Both officers are trying to lower their percentage of body fat. Which officer's program do you think will work better? Explain.

2. An officer goes to a one hour aerobics class once a week but has no other regular exercise program. She tells her partner, "I've got two kids and I'm running all the time to keep up with them. I figure one class is better than nothing." Is she right? Explain. What exercise recommendations would you make that could fit into the demands of her current lifestyle?

Continued on next page

Activity questions (continued)

3. Complete the following table describing the principles of physical conditioning.

Principle	Description
Specificity	
	how often exercise sessions occur in a given week
	stress level at which a person is exercising; speed or pace of exercise
Volume	
Active recovery	
Periodization/program design	
Progression	

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4. Near the end of his run through his local neighborhood, an officer trips and sprains his ankle. He limps the last block to his home. How should he treat his injury? What signs should signal him to call the doctor?

5. What role(s) does stretching play in an exercise program? Why is it important? Is it always necessary to stretch before exercise? Why or why not? Is it always necessary to warm-up at all?

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Activity questions (continued)

6. Two officers are working out together in their local gym. One has biked for 40 minutes on the stationary bike while the other has run for 40 minutes on the treadmill. They decide to cool down together by walking briskly around the block for five minutes, then go in and stretch and do some weight lifting. Will this work equally well for both officers? Explain.

Continued on next page

Activity questions (continued)

7. For each of the following fitness components, describe one assessment that officers can use to evaluate their personal fitness.

Fitness Components	Assessment Test
Cardiovascular Aerobic Anaerobic	
Muscular strength Strength Power Endurance	
Acceleration and agility	
Flexibility/stability/mobility	
Core	
Body composition vs. performance	
Recovery	

Continued on next page

Activity questions (continued)

8. An officer wants to increase her muscular strength and lower her percentage of body fat by three percent (to meet the standard for the 80th percentile). Her free time will allow her to exercise for one hour, five times a week. Provide a description of a personal fitness program you would recommend to help her meet her goals. What factors might help her make actual exercise choices?

9. Calculate your own training heart rate range.

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Student notes

Chapter 2

Nutrition for Life

Overview

Learning need

Peace officers must recognize that proper nutrition is critical to maintaining body composition, physical conditioning, and reducing their risk of illness or injury.

Learning objectives

The chart below identifies the student learning objectives for this chapter.

After completing study of this chapter, the student will be able to:	E.O. Code
• Describe how to accomplish fitness goals using nutritional planning	32.02.EO15
• Discuss the role of supplementation and accomplishing fitness goals	32.02.EO16

In this chapter

This chapter focuses on nutrition for lifetime fitness. Refer to the following chart for specific topics.

Components of Food

[32.02.EO15, 32.02.EO16]

Introduction

Proper nutrition provides the fuel to perform optimally, both physically and mentally.

Nutrition

Nutrition is defined as the science of nourishing the body properly, including providing for its growth, maintenance, and repair.

Nutrition plays a critical role in lifetime fitness. Proper nutrition:

- provides energy for activity
- supplies nutrients for body growth and repair
- plays an essential part in body composition management
- helps combat disease and injury

Basic food components

A well balanced diet includes six basic components that work together to satisfy the body's need for calories and essential nutrients. All foods contain a combination of these components.

These basic components of food are:

- fats
- proteins
- carbohydrates
- water
- vitamins
- minerals

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Fats

Fats are the most concentrated food source of energy providing approximately 2.5 times more calories than the same amount of protein or carbohydrate. Fats are the major fuel used by the body during endurance activities however; they are not a source of quick energy. The following table describes the four basic types of fat.

Type of Fat	Description	Example
Saturated Fat	• Solid at room temperature • ***May contain cholesterol*** and/or may be used by the body to manufacture cholesterol • May be animal fat or **hydrogenated** plant fat	• Bacon grease • Butter • Lard • Margarine • Fat in meat • Cocoa butter • Oils high in saturated fat include: - palm oil - palm kernel oil - coconut oil
Trans Fat	• Man-made by combining hydrogen atoms to vegetable oil • The process, called hydrogenation • Makes the fat solid and gives it a longer shelf life • In the body, trans fat contributes to disease just like saturated fat	• Margarine and shortening • Deep-fat fried foods like donuts • Baked goods like breads • Crackers • Ready-to-eat cereals • Cookies

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Fats (continued)

Type of Fat	Description	Example
Polyunsaturated Fat	• Unsaturated fats are liquid at room temperature • Polyunsaturated and monounsaturated refer to the type of chemical bonds prevalent in the fat • Come from plant sources • ***Contain no cholesterol*** and are not used by the body to manufacture cholesterol	Oils which are high in polyunsaturated fats (though they contain some monounsaturated and saturated fat) include: • corn oil • cottonseed oil • soybean oil • safflower oil • wheat germ oil
Monounsaturated Fat		Oils which are high in monounsaturated fats (though they contain some polyunsaturated and saturated fat) include: • olive oil • peanut oil • canola oil • avocado oil

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Fat intake

Participants should remember if their intake of fat calories exceeds the number of calories they use during activity; the excess will be stored as body fat.

The following table offers recommendations and values a person may use when planning or evaluating dietary fat consumption.

Fat	
Guideline for Percentage of Daily Calorie Intake	30 percent or less
Approximate Calories per Gram	9 calories per gram
Dietary Recommendations	
• Consuming less cholesterol and saturated fat and more polyunsaturated and monounsaturated fat is thought to help reduce the risk of heart disease • Generally, poultry and fish are lower in saturated fat than red meat. However, some cuts of properly cooked lean red meat may be lower in saturated fat than dark poultry meat cooked with the skin on • Eating an excess of saturated fat foods, such as beef, pork, butter, or cheese, may lead to elevated blood cholesterol • Plant source fats, with some exceptions, usually have a much lower content of saturated fat and a higher content of unsaturated fat • A mix of polyunsaturated and monounsaturated fats is generally the best dietary choice	

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Proteins

Proteins are present in all living plants and animal tissue. They are essential to life because they are a vital part of every cell. Proteins furnish the building blocks for body tissues and are needed for body repair and maintenance.

Protein is also a component of enzymes and hormones. Protein should not be considered as a good source of energy. In fact, the body can only use protein as energy when fats and carbohydrates are not available.

Amino acids

Proteins are made up of relatively simple nitrogen-containing compounds called amino acids. An officer's body uses these amino acids to build and repair its own cells.

There are 21 to 23 amino acids needed by the body to build tissue. Thirteen to fifteen of these are produced by the body itself. There are eight amino acids that the body cannot make. These are referred to as **essential amino acids**. Everyone must get essential amino acids from dietary sources.

Complete and incomplete proteins

For students to determine where they will get their dietary protein, they must understand the concept of a complete protein. A **complete protein** is one that contains all of the eight essential amino acids.

Students should remember the following.

- Animal sources contain complete proteins (e.g., fish, milk, eggs)
- Plant sources contain incomplete proteins (e.g., vegetables, grains)
- Incomplete proteins may be combined to make complete proteins (e.g., vegetables and grain can be combined to make complete proteins)

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Protein intake

The following table offers recommendations and values a person may use when planning or evaluating their dietary protein consumption.

Protein	
Percentage of Daily Calorie Intake	10 to 35 percent
Approximate Calories per Gram	4 calories per gram
Dietary Recommendations	
• Healthy meal plans must include complete proteins • Protein from animal sources and from vegetable and grain combinations are both adequate • Vegetarians must find varied protein sources to combine to get all eight essential amino acids • While animal sources provide complete proteins, students should also evaluate the amount of fat or cholesterol contained in the particular animal product • Requirements are typically calculated based on age, body weight, and physical activity. For example, most adults require only 0.8 grams of protein per kilogram (.36 grams per pound) of body weight per day • Adult athletes who are training vigorously on a daily basis may require 1.0-1.7 grams/kg/day (.45-80 grams/lb/day). This can easily be obtained in the diet • Strive to choose protein sources that are low in saturated fat • Extremely high protein diets can cause rapid weight loss due to diuretic effect and are not recommended. Furthermore, excess dietary protein is converted to glucose and fatty acids by the liver Credit: *The Cooper Institute, Dallas, TX*	

NOTE: A general guideline for consuming protein is the "20 – 10" rule where a person strives to eat at least 20 grams of protein at each of their three main meals and at least 10 grams of protein as part of two snacks (mid-morning and mid-afternoon).

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Components of Food, Continued

Carbohydrates

Carbohydrates are the most abundant nutrients in foods. They include both starches and sugars. Carbohydrates are the most efficient and readily available sources of energy for the body and are especially good for high intensity exercise. They are also the major sources of energy for the brain and are necessary for metabolizing protein and fat.

Carbohydrates supply energy by being converted into blood glucose, which can be used by body cells. Excess carbohydrates can be stored as glycogen in muscles and the liver for less than a day. When needed, the glycogen is converted to glucose.

Simple and complex carbohydrates

Carbohydrates can be divided into two categories.

- Simple carbohydrates
- Complex carbohydrates

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Simple and complex carbohydrates (continued)

The following table describes simple and complex carbohydrates.

Carbohydrate Type	Description	Examples

Simple Carbohydrates	• Made up of sugars such as:
	  - sucrose
	  - fructose
	  - glucose
	• Broken down into glucose very quickly to supply energy
	• Do not, typically, provide a sustained source of energy
		• Sugar
		• Honey
		• Candy

Complex Carbohydrates	• Made up of starches, glycogen, and cellulose (fiber) • Broken down into glucose in approximately 1 to 4 hours • Provide more sustained energy	• Grain and grain products (e.g., breads, cereals, bran, pasta) • Legumes (e.g., beans, peas, lentils) • Tubers (e.g., potatoes, yams) • Fruits • Vegetables

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Carbohydrate intake

The following table offers recommendations and values a person may use when planning or evaluating their dietary carbohydrate consumption. People should remember that if their intake of carbohydrate calories exceeds the number of calories they use for bodily activity, the excess will be stored as body fat.

Carbohydrates	
Percentage of Daily Calorie Intake	50 percent or more
Approximate Calories per Gram	4 calories per gram
Dietary Recommendations	
• Most of a person's diet should be made up of carbohydrates in varied forms, including grains, fruits, vegetables, and legumes • Carbohydrate loading techniques (super-compensation) should be used no more than a few times per year and should not be used by young athletes and adults at risk for heart disease • Carbohydrate loading may increase muscle glycogen • Carbohydrate loading is useless to anyone exercising less than several hours a day • Avoid simple carbohydrates in large amounts such as glucose, sugar, honey, candy or highly sweetened solutions such as soda or many commercial athletic drinks • Eating complex vs. simple carbohydrates and combining protein with carbohydrate intake can keep your glycemic (blood sugar) levels in normal range	

NOTE: Students should recognize that the "--ose" ending in ingredients on food labels usually refers to a sugar (e.g., sucrose, fructose, glucose).

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Water

Water is essential to survival. Every function and movement of an a person's body requires water. A person can live only a few days without water. Water holds substances in solution in the blood, digestive tract, and tissues.

Water is required for:

- circulation
- excretion
- regulation of body temperature
- many other body processes

The human body is approximately 2/3 water. To remain healthy, people must replace water that is used and excreted. Water is excreted in the following ways.

- in urine
- in stools
- by the skin during perspiration
- by the lungs as part of breathing

Usually, more water is excreted by the kidneys in urine than by the other channels, but this will change in hot weather or during strenuous exercise. Under these conditions, a larger amount of water is eliminated as perspiration in order to regulate body temperature. This is why *it is critical to drink more water during hot weather or while exercising.*

How can I tell if I'm hydrated?

Make sure you urinate frequently (every 2-3 hours) and you have an ample amount of clear or light-colored urine. If your urine is dark or you don't have much of it, you are probably dehydrated. Focus on doing a better job with all-day hydration and fluid intake before, during and after workouts.

NOTE: **Be Aware:** If you are taking vitamin supplements your urine may change color to bright yellow or discolored for a few hours.

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Water intake

Officers, along with most people in the United States, don't drink enough water. The following table discusses water intake.

Water	
Guideline for Consumption	64 ounces of water per day (8 glasses)
Approximate Calories per Gram	0
Dietary Recommendations	
• A person should consume water according to a schedule rather than waiting until they feel thirsty. Perceived thirst indicates that some dehydration has already taken place • The best source of water replacement is pure water • Water can also be replaced from other liquids such as milk, soups, and other beverages • Solid foods such as fresh or cooked fruits and vegetables and cooked cereals (e.g., oatmeal) also contain water • Increase water intake in hot weather and during exercise	

NOTE: A person should recognize that not all liquids contain an equal amount of water. Milk, and cream soups, for instance, contains a great deal of solid matter along with the water content. Therefore, eight ounces of milk is not equivalent to eight ounces of water.

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Fluid replacement and exercise

Everyone should drink more water during periods of exercise. It is a good idea to drink several cups of water before exercising. If the exercise program is prolonged or vigorous, the person should drink small quantities of water every 15-20 minutes during the activity.

To get an idea how much fluid is lost during exercise, a person should weigh themselves before and after prolonged or vigorous programs. A two-pound weight loss represents one quart of body fluid.

Sport drinks

There have been hundreds of well designed published studies regarding sports drinks and athletic performance over the past 40 years supporting that sport drinks provide a significant physiological advantage over water during prolonged physical training and activities.

Thus, individuals training or competing for long periods of time should consider using a sports drink, particularly during warm, humid conditions.

When glycogen depletion, dehydration and significant electrolyte losses are an issue, i.e. during prolonged exercise where profuse sweating is occurring. The major electrolyte lost by the body through sweating is sodium.

Sports drinks are unnecessary for short-term exercise. Cool water should be used to replace fluids during short-term exercise lasting less than 1 hour in most cases. A general rule is approximately 6-12 ounces per 15-20 minutes.

Credit: *The Cooper Institute, Dallas, TX*

Hydration tips

- Start drinking fluids (water preferred) when you wake up in the morning
- Drink fluids throughout the day to maximize hydration
- Choose sport drinks instead of water, only during hard workouts
- A good sport drink contains at least 70 mg of sodium and 10-18 grams of carbohydrates per 8-ounce serving
- Eat foods with high fluid content, such as fruits, yogurt, soups, stews and salads

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Consequences of dehydration

- Decreased endurance
- Decreased strength and power
- Decreased ability to cool the body
- Decreased blood flow to your working muscles
- Decreased concentration
- Slowed recovery
- Increased risk of injury
- Increased risk of heat cramping and heat related illnesses

Vitamins

Vitamins assist in hundreds of chemical reactions that take place continuously in the human body. Vitamins are divided into two classes as described in the table below.

Vitamin Class	Examples	Characteristics
Fat Soluble	A, D, E, K	• Absorbed from the intestine along with fats and lipids in foods • Excess stored in the body and toxic levels can be easily reached • Somewhat stable under heat and less likely to be lost in cooking and processing of foods
Water Soluble	C, B Complex	• Dissolves in water and are assimilated by the body as needed • Excess excreted in the urine • Generally unstable under heat and likely to be lost in cooking or processing

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Minerals

There are more than 24 different minerals used by the human body. Their major role is to assist with chemical reactions that occur within body cells. Minerals help to release energy during the breakdown of energy sources.

A person can fully meet their mineral requirements by eating a well balanced diet. A person's need for minerals does not, generally, increase with physical activity. There is an exception. During intense prolonged exercise in hot weather the body does have an increased requirement for sodium and potassium.

People should not try to replace sodium lost to sweat by taking salt tablets. The excessive salt intake places extra burden on the kidneys. Potassium and sodium should be replaced at the next meal.

Supplements

Vitamins and minerals are associated with a number of myths and unproven claims. Many people believe that large doses of certain vitamins or minerals can offer miracle cures for a wide range of ailments from depression to cancer.

Though more information is coming to light on the role certain vitamins and minerals play in protecting the body, people who take large doses of supplements based on incomplete or nonexistent research may actually be harming themselves. This is especially true with fat soluble vitamins (A, D, E, K) and trace minerals which can be stored in the body and can easily reach toxic levels.

People should remember that a balanced, healthy diet can provide all of the vitamins and minerals needed by the body. Vitamin and mineral supplements can help correct imbalances resulting from poor eating habits, but they can never take the place of a healthy diet of fresh and unrefined foods.

Nutritional Planning

Goals

The purpose of good nutrition is to provide the body with what it needs for performance, maintenance, and repair. People who recognize nutrition as a key part of lifetime fitness use nutritional planning to help:

- maintain or improve body composition
- decrease risk of disease and injury
- manage stress

Developing a nutrition plan

Lifetime fitness requires a well balanced diet. A good nutrition plan should identify the person's daily percentage intake of fats, proteins, and complex carbohydrates. The following table identifies the percentages officers should use as guidelines when developing a nutrition plan.

Component	Daily Percentage Intake
Fats	30% or less
Proteins	20%
Complex carbohydrates	50% or more

NOTE: Beginning a new nutrition program, it may be useful for a person to track both their target consumption and actual consumption to see how calories are truly distributed.

NOTE: Simple carbohydrates (sugars) should be considered as condiments or treats only, and should not form a substantial part of a healthy diet. For many, this may mean severely restricting soda or candy intake.

NOTE: A general guideline is that a person should consume at least 50 grams of carbohydrates, 15 grams of protein, and fluids as soon as possible after completing exercise.

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Supplementation using sports bars (potential uses)

- Pre-Exercise: High carbohydrate (30+ grams)
- Post-Exercise: High Protein (15+ grams)
- Between meals (snacks): Natural fruit bars (nuts, seeds, dried fruits-high fiber)
- Meal replacement: High calorie mixed nutrition bars (250-300 calories)

Typical dietary changes

A well balanced diet, unfortunately, is not the norm. Most Americans have poor eating habits. Applying a sound nutrition plan usually results in the following changes to the diet of most Americans.

- Increase in water intake
- Increase in fiber intake
- Increase in complex carbohydrate intake (e.g., whole grains, fruits, vegetables)
- Moderate reduction in protein intake
- Reduction in refined sugar intake
- Reduction in caffeine and alcohol intake
- Significant reduction in fat intake

Calories

In addition to the percentage of daily intake a person receives from each food component, anyone serious about managing body composition will also need to know the total number of calories per day they should consume.

The calories required by an individual will depend on a person's:

- age
- gender
- size
- duration and intensity of physical activity
- body management objectives
- genetics

For instance, a 150-pound female officer engaging in a regular program of physical conditioning who desires to lose 20 pounds may choose to consume fewer calories than another 150-pound active female officer who merely wants to maintain her current weight.

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Weight loss

For weight loss to occur, the number of calories used by the body for fuel must exceed the overall number of calories the person consumes.

Calorie counting may be most useful when establishing a new nutritional program. This can help a person see the effects of individual food selections. Once a person becomes accustomed to eating a healthy, well balanced diet, calorie counting should not be necessary in ordinary circumstances.

People who want to achieve and maintain a healthy weight should start working at lifestyle changes they can maintain.

"Fad diets are often programs you're supposed to follow for just a few weeks. Nutrition experts insist that the right approach to weight loss is to change your lifestyle -- permanently." (Source: Martin F. Downs-WebMD Weight Loss Clinic-Exclusive Feature)

NOTE: Chapter 1 provides additional information on calories as related to body composition.

Food pyramid

The food pyramid guide recommends the number of servings a person should select each day from each food group. A person may find this useful for daily meal planning.

Continued on next page

10 tips
Nutrition Education Series

choose MyPlate

10 tips to a great plate

Making food choices for a healthy lifestyle can be as simple as using these 10 Tips.
Use the ideas in this list to *balance your calories*, to choose foods to *eat more often*, and to cut back on foods to *eat less often*.

1 balance calories

Find out how many calories YOU need for a day as a first step in managing your weight. Go to www.ChooseMyPlate.gov to find your calorie level. Being physically active also helps you balance calories.

2 enjoy your food, but eat less

Take the time to fully enjoy your food as you eat it. Eating too fast or when your attention is elsewhere may lead to eating too many calories. Pay attention to hunger and fullness cues before, during, and after meals. Use them to recognize when to eat and when you've had enough.

3 avoid oversized portions

Use a smaller plate, bowl, and glass. Portion out foods before you eat. When eating out, choose a smaller size option, share a dish, or take home part of your meal.

4 foods to eat more often

Eat more vegetables, fruits, whole grains, and fat-free or 1% milk and dairy products. These foods have the nutrients you need for health—including potassium, calcium, vitamin D, and fiber. Make them the basis for meals and snacks.

5 make half your plate fruits and vegetables

Choose red, orange, and dark-green vegetables like tomatoes, sweet potatoes, and broccoli, along with other vegetables for your meals. Add fruit to meals as part of main or side dishes or as dessert.

6 switch to fat-free or low-fat (1%) milk

They have the same amount of calcium and other essential nutrients as whole milk, but fewer calories and less saturated fat.

7 make half your grains whole grains

To eat more whole grains, substitute a whole-grain product for a refined product—such as eating whole-wheat bread instead of white bread or brown rice instead of white rice.

8 foods to eat less often

Cut back on foods high in solid fats, added sugars, and salt. They include cakes, cookies, ice cream, candies, sweetened drinks, pizza, and fatty meats like ribs, sausages, bacon, and hot dogs. Use these foods as occasional treats, not everyday foods.

9 compare sodium in foods

Use the Nutrition Facts label to choose lower sodium versions of foods like soup, bread, and frozen meals. Select canned foods labeled "low sodium," "reduced sodium," or "no salt added."

10 drink water instead of sugary drinks

Cut calories by drinking water or unsweetened beverages. Soda, energy drinks, and sports drinks are a major source of added sugar, and calories, in American diets.

USDA Center for Nutrition Policy and Promotion

Go to www.ChooseMyPlate.gov for more information.

DG TipSheet No. 1
June 2011
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Food pyramid (continued)

NOTE: A person who has excess body fat can improve his body composition and decrease his risk of cardiovascular disease by using nutritional planning to reduce some of the fat and calories in his diet. A combination of nutrition and exercise is the best way to improve body composition.

NOTE: People who plan to include enough calcium in their diets have a lower risk of osteoporosis and bone loss later in life. This is especially true for females.

Chapter Synopsis

Learning need

Peace officers must recognize that proper nutrition is critical to maintaining body composition, physical conditioning, and reducing their risk of illness or injury.

Basic food components

A well balanced diet includes six basic components that work together to satisfy a person's need for calories and essential nutrients.

Nutritional planning [32.02.EO15]

Applying a sound nutrition plan usually results in the following changes to the diet of most Americans.

- Increase in water intake
- Increase in fiber intake
- Increase in complex carbohydrate intake (e.g., whole grains, fruits, vegetables)
- Moderate reduction in protein intake
- Reduction in refined sugar intake
- Reduction in caffeine and alcohol intake
- Reduce intake of saturated and trans fat

Supplementation and fitness goals [32.02.EO16]

The use of supplements is one way to help you accomplish your fitness goals. It is important to understand that the benefits of supplementation can only be achieved when combined with proper nutrition.

Workbook Learning Activities

Introduction

To help you review and apply the material covered in this chapter, a selection of learning activities has been included. No answers are provided. However, by referring to the appropriate text, you should be able to prepare a response.

Activity questions

1. Consider your current diet. Write down everything you ate and drank yesterday. (Use the day before if yesterday was not typical.) How does your listed diet compare to the daily servings recommended from each food group as well as the recommendation for water intake? How would you estimate your diet usually compares to the recommended percentage of fat, protein, and carbohydrate? (Check percentages on a few food items if you are unfamiliar with them.) Based on sound nutritional principles, what, if any, changes should you make in your diet? What difficulties do you foresee in doing so?

   NOTE: Online resources are available to help you assess your food intake.

Continued on next page

Activity questions (continued)

2. What are essential proteins? Describe two different meals that contain low fat sources of protein. At least one of these meals should feature incomplete proteins combined to make a complete protein. What nutritional advantages would these meals have over a fast food cheeseburger and fries?

3. An officer is trying to reduce his body fat percentage from 25 percent to 12 percent. In addition to beginning an exercise program, he has lowered fats and increased carbohydrates in his diet. He says that since fats is what counts, it should not matter that his total calorie count is about 3000 per day, roughly 600 of which are from the numerous sodas and sports drinks he consumes. What is wrong with this officer's reasoning? What suggestions would you make?

Continued on next page

Activity questions (continued)

4. Name the four basic categories of fat and give an example of each. Explain the difference between saturated and unsaturated fat.

5. Two officers are exercising together. Before beginning their 45 minutes of aerobics and weight lifting, the first officer drinks two glasses of water. The second officer passes on the water saying, "No thanks, I'm not thirsty." What advice would you give to the second officer if you were the exercise partner?

Continued on next page

Activity questions (continued)

6. Why should officers be careful about taking high doses of vitamins such as A, D, E, or K?

7. Examine the nutritional content of several different snack bars. Determine which would be the most healthy and why.

8. What over the counter supplements do you think are most effective and which ones do you think are least effective?

Workbook Corrections

Suggested corrections to this workbook can be made by going to the POST website at: www.post.ca.gov

Chapter 3

Common Medical Concerns for Peace Officers

Overview

Learning need

Peace officers need to understand common health problems so they may use appropriate risk management techniques to ensure their health and physical fitness.

Learning objectives

The chart below identifies the student learning objectives for this chapter.

After completing study of this chapter, the student will be able to:	E.O. Code
• Discuss illnesses and injuries commonly associated with law enforcement officers • Discuss strategies for the prevention of illnesses and injuries commonly associated with law enforcement officers	32.03.EO8 32.03.EO5

In this chapter

This chapter focuses on medical issues commonly related to peace officers. Refer to the following chart for specific topics.

Fitness Consequences

Introduction

Maintaining good fitness is a professional responsibility for every law enforcement officer. Officers must depend on their personal fitness in the line of duty for their own safety of fellow officers, and members of the community they serve.

NOTE: Peace officers are encouraged to establish an on-going relationship with a personal medical provider who can, in confidence, provide individualized assessments, testing and advice in support of a lifetime wellness program.

Common physiological disablers

There are several physical disablers and illnesses prevalent among members of the law enforcement profession. The level of risk for many of these problems can be greatly minimized by a lifestyle that emphasizes personal fitness.

Common disablers include, but are not limited to the following:

- Cardiovascular disease
  - Heart attack
  - Stroke
  - High blood pressure

- Gastrointestinal disorders
  - Stomach ulcers
  - Colorectal cancer
  - Stomach cancer

Continued on next page

Fitness Consequences, Continued

Common physiological disablers (continued)

- Structural injuries
  - Neck
  - Back
  - Joints
  - Tendons
  - Ligaments
  - Muscles

- Substance abuse

NOTE: Peace officers are also at a higher level of risk for substance abuse associated with inappropriate coping with increased levels of stress. Additional information on this topic is included in Chapter 4 of this workbook.

Cardiovascular Disease

[32.03.EO5, 32.03.EO8]

Introduction

Cardiovascular disease covers several disorders that, if untreated, can contribute to coronary heart diseases. More than 750,000 Americans annually become victims of coronary heart disease in the form of heart attacks, also known as myocardial infarction.

Cardiovascular disease

Peace officers are considered to be a high risk group for coronary heart disease because of the nature and environment of their work. Research indicates that cardiovascular problems are becoming more prevalent among younger officers, possibly due to eating habits.

Cases of heart disease have been documented in individuals in their twenties, and cardiac-related disability claims by law enforcement personnel in their late thirties and forties are becoming common occurrences.

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Cardiovascular Disease, Continued

Causes, risk factors, and prevention

The following table describes the causes, risk factors, and preventive measures associated with a heart attack.

Causes	Risk Factors	Preventive Measures
• Atherosclerosis • Arteriosclerosis • Blood clots • Stress	• Major factors include: - High cholesterol - Hypertension (high blood pressure) - Smoking - Physical inactivity • Contributing factors include: - High body fat - Stress - Stimulant use (caffeine, ephedrine) - Genetics - High fat diet	• Aerobic exercise • Weight control and body composition management • Proper nutrition • Smoking cessation • Stress management

NOTE: Officers should be aware that all of the risk factors for coronary heart disease can be modified to lower the officer's risk of heart attack.

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Cardiovascular Disease, Continued

Atherosclerosis

Atherosclerosis is a condition in which a fatty substance called plaque collects on the inside walls of the arteries. The plaque deposit results in a narrowing of the arteries and reduces blood and oxygen flow to the heart, brain or other parts of the body served by the narrowed artery.

If a coronary (heart) artery is clogged, the oxygen supply to the heart is reduced. As the process continues, the risk of a heart attack increases. The officer may also experience chest pain known as angina as a warning sign. The reduced oxygen may affect the heart's capacity for work *without obvious symptoms*. Officers cannot tell if they have atherosclerosis without a medical checkup.

In addition to heart attacks, atherosclerosis can cause strokes, loss of physical or mental function, or gangrene of body tissue. A stroke can occur when a blood vessel supplying oxygen and nutrients to the brain becomes clogged.

Arteriosclerosis

Arteriosclerosis is a general term which includes a number of blood vessel diseases including atherosclerosis as well as change in the shape of blood vessels that commonly occurs with age. Blood vessels often become more contorted and less elastic with age, and arteriosclerosis is a common peripheral vascular disease normally found in the elderly.

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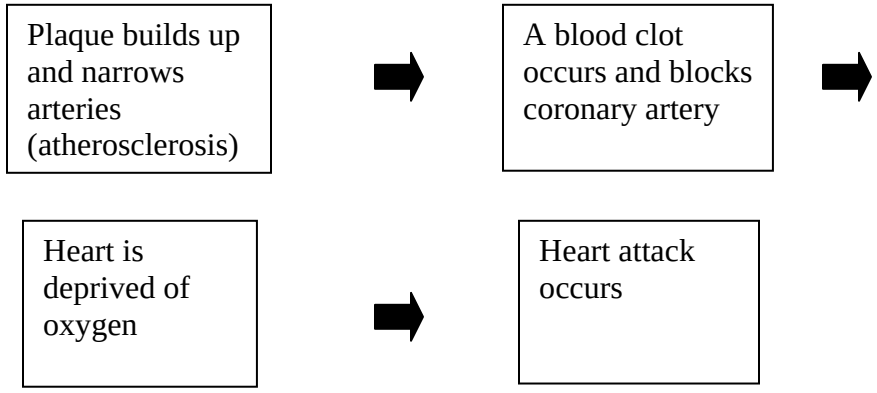
Cardiovascular Disease, Continued

Anatomy of a heart attack

The most common form of a heart attack occurs when a blood clot (thrombosis) clogs a coronary artery which has been narrowed by plaque.



Stress

Law enforcement activities can place officers under a great deal of emotional and physical stress. An officer is often required to go suddenly from minimum to maximum effort. This sudden change in activity is stressful to the officer's body.

Emotional and physical stress can contribute to the progression of cardiovascular disorders (e.g., high blood pressure or cholesterol). Proper physical conditioning can help deal with this intermittent physical stress.

Improper exercise warm-up/ sudden effort

There is a positive relationship between engaging in an exercise warm-up activity and healthy cardiovascular functioning. Tests have shown that an officer's failure to warm-up before vigorous activity may result in **electrocardiogram** abnormalities.

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Cardiovascular Disease, Continued

Cholesterol

Cholesterol is a waxy, fat-like substance manufactured by the liver and found in all tissues. Cholesterol is an important part of the normal system of blood fats found in humans and animals. Cholesterol is essential to several body processes, including:

- hormone production
- brain development
- nervous system functioning

High blood cholesterol, high blood pressure, and cigarette smoking are three major risk factors for heart disease.

Blood vs. dietary cholesterol

There are two forms of cholesterol: blood cholesterol and dietary cholesterol. The following table differentiates between both forms.

Blood Cholesterol	Dietary Cholesterol
• The cholesterol circulating in the bloodstream • Produced by the liver • What is measured in the standard cholesterol test	• The cholesterol contained in food • Found naturally in all animal tissue, but not in plants • Fatty meats, diary products, and eggs are the most common sources of dietary cholesterol

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Converting dietary cholesterol

The liver makes most of the blood cholesterol a body needs. It is not necessary for a healthy person to consume any dietary cholesterol in order to maintain healthy levels.

The liver can also produce *additional blood cholesterol* from foods that are high in dietary cholesterol (e.g., animal products). High fat plant foods, such as cooking oils, can also contribute to high blood cholesterol. Generally, the body makes only about 80 percent of its cholesterol; the rest comes from the food the officer eats.

High blood cholesterol

Since cholesterol is required for healthy body functioning, normal amounts of it are important. Cholesterol only becomes a problem when the body makes too much of it.

The bloodstream regularly carries cholesterol from the liver to other body cells. Excess cholesterol that is not used by the body can collect on the lining of blood vessels (atherosclerosis).

The level of blood cholesterol in an officer's body is affected by two things:

- genetic makeup (which determines how much the liver produces)
- the amount of saturated fat and cholesterol in the diet

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Types of blood cholesterol

The specific *type* of cholesterol found in the blood is as important as the total amount. Since cholesterol is a fat-like substance, it cannot mix with blood, which is water based. Because of this it moves through the bloodstream in protein packets called **lipoproteins**. The two most common types of lipoproteins are described in the following table.

Low Density Lipoprotein (LDL)	High Density Lipoprotein (HDL)
• Often referred to as "bad" cholesterol • Can "stick" to the walls of the arteries and can cause atherosclerosis and heart disease • Normally makes up most of the cholesterol in the bloodstream	• Often referred to as "good" cholesterol • May help prevent the formation of fatty plaque in the arteries by carrying excess cholesterol (even LDL) back to the liver for processing or removal • Higher levels may actually help protect against heart disease • Exercise has been proven to raise HDL, "good" cholesterol levels

NOTE: While HDL and LDL make up most of the blood cholesterol, there are other kinds of blood fat, including very low density lipoprotein (VLDL), and intermediates density lipoprotein (IDL).

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Testing cholesterol levels

There are no outward signs or symptoms to indicate that a person may have dangerously high levels of cholesterol. Cholesterol levels can only be measured by using a simple blood test.

Initial blood screening determines only the amount of *total cholesterol* in a person's bloodstream. Physicians may wish to run a second, more extensive test which identifies the specific levels of LDL and HDL in the bloodstream.

Desirable cholesterol levels

All adults should have their blood cholesterol tested at least every five years. The following table shows recommended cholesterol levels for adults based on recommendations from the National Heart, Lung, and Blood Institute, National Institutes of Health.

Level Category	Total Cholesterol	LDL Cholesterol	HDL Cholesterol
Desirable	200 mg/dl or less	less than 130 mg/dl	35 mg/dl or higher
Borderline Risk	200-239 mg/dl	130-159 mg/dl	less than 35 mg/dl
High Risk	240 mg/dl and above	160 mg/dl and above	

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Cardiovascular Disease, Continued

Improving cholesterol levels

Research has shown that lowering abnormally high cholesterol can help officers live longer, reduce the risk of heart attack and lower the likelihood that surgery will be required to unblock arteries.

If a person's cholesterol levels, along with other risk factors, places that person at risk for cardiovascular disease, the physician may suggest any or all of the following tactics.

- Begin and maintain a cholesterol-lowering diet (low cholesterol, low fat)
- Increase the amount of aerobic exercise
- Quit smoking
- Limit alcohol and caffeine intake

In certain extreme cases, physicians may also recommend use of cholesterol-lowering drugs. Such medications may have harmful side effects and must be carefully monitored by physicians.

High blood pressure

High blood pressure, frequently referred to as **hypertension**, is also a critical risk for heart disease. About 90 percent of the cases of high blood pressure have no known cause and there are no outward signs or symptoms for high blood pressure. Because of this, it is critical that adults have their blood pressure checked on a regular basis.

Risk factors

Small blood vessels, called arterioles, regulate blood pressure. If the arterioles become narrowed, it becomes more difficult for blood to pass through. The heart must work harder to force sufficient amounts of blood through the body. The additional stress to the heart as well as the increased pressure to the walls of the arterioles can place the person at risk of heart attack and stroke.

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Risk factors (continued)

Lifestyle risk factors that may contribute to high blood pressure include:

- tobacco use
- high body fat
- physical inactivity
- stress
- stimulant use (e.g., caffeine, ephedrine)
- sodium intake

Blood pressure levels

The following table shows normal and low blood pressure readings.

Blood Pressure Category	Reading
Normal	120/80 mmHg
Prehypertension	121-139/81-89 mmHg
Stage 1 hypertension	140-159/90-99 mmHg
Stage 2 hypertension	160/100 mmHg and above
* mmHg means millimeters of mercury, the unit of measure for blood pressure.	

NOTE: The first and higher number is the systolic pressure. This reflects the maximum amount of pressure exerted on a person's arteries. The second and smaller number is the diastolic pressure. This reflects the minimum pressure exerted on the arteries.

Treating high blood pressure

Doctors may choose to treat high blood pressure with medication and/or lifestyle change depending on the severity and duration of the problem.

Gastrointestinal Disorders and Disease

Introduction

Peace officers, as a group, are frequently at risk for gastrointestinal disorders or diseases such as ulcers and certain forms of cancer.

Causes, risk factors, and prevention

The following table describes the causes, risk factors, and preventive measures associated with three gastrointestinal disorders frequently experienced by peace officers.

Gastrointestinal Disorder/Disease	Risk Factors	Causes	Preventive Measures
Ulcers	• Job related stress • Inadequate stress management	• Bacterial infection • Excess stomach acid • Failure to effectively manage stress • Release of adrenaline-like substances prompted by stress (e.g., fight or flight reaction)	• Stress management and stress reduction • Good nutrition • Regular aerobic exercise
Colorectal Cancer	• Low fiber diet	• Specific causes unknown • Dietary links may exist	

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Gastrointestinal Disorders and Disease, Continued

Causes, risk factors, and prevention (continued)

Gastrointestinal Disorder/Disease	Risk Factors	Causes	Preventive Measures
Stomach Cancer	• Pernicious anemia, caused by malformation of the red blood cells • Diet high in nitrates, salt, and foods that have been smoked • Low vitamin C intake	• Specific causes unknown • Dietary links may exist	• Stress management and stress reduction • Good nutrition • Regular aerobic exercise

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Ulcers

An **ulcer** is an open sore in the stomach lining that heals slowly or will not heal on its own. Gastrointestinal ulcers generally occur in the stomach or in the duodenum, the part of the intestine immediately below the stomach.

The following table describes the mechanisms and treatments for gastrointestinal ulcers.

Mechanisms	Treatments
• Bacteria cause a break in the mucous lining of the stomach or duodenum, creating a sore. Excess stomach acid, partially caused by job stressors, keeps the ulcer from healing and it becomes chronic • Ulcers sometimes bleed and are most dangerous if they perforate the stomach, leading to peritonitis (infection of the abdominal cavity) • Chronic alcohol abuse	• Bacteria have been found to be a critical factor in many ulcers. Because of this, the first line of treatment for ulcers is currently antibiotics • Other treatments include: - diet modification - stress management • Some severe ulcers may require surgery

NOTE: Though moderate alcohol consumption may be part of an overall healthy lifestyle for many officers, alcohol can aggravate ulcers and further damage ulcerated tissue.

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Colorectal cancer

More than 60,000 deaths occur annually from colorectal cancer. A high percentage of these deaths could be avoided with appropriate screening and follow up treatment. Students should ask their doctor about the screening for them based on age and risk factors.

Screening can range from stool sample testing to rectal exams after age 40 and sigmoidoscopy or colonoscopy after age 50 or in the case of increased risk. These last two involve the use of fiber optic scopes.

The following table shows the mechanisms and treatments for colorectal cancer.

Mechanisms	Treatments
• The colon and the rectum are exposed to a wide variety of metabolic and environmental toxins consumed and excreted daily. The bacteria in the intestinal tract also produce chemicals	• Early screening allows doctors to detect and remove polyps that may turn into cancer • Treatment is dependent on the location, type, and extent of the cancer
• This combination of substances comes into contact with the inner wall of the colon and rectum. It is believed that exposure to this combination of substances may cause cancer in susceptible people • A high fiber diet limits the amount of time the colon and rectum are in contact with these chemicals by speeding up elimination. A low fiber diet allows increased contact	• Treatment may include: - surgery - chemotherapy, and/or - radiation

NOTE: Students need to understand early detection is critical to survival.

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Stomach cancer

There are 24,000 new cases of stomach cancer annually in the United States. The good news for officers, who are a risk group, is that the disease appears to be on the decline.

Mechanisms	Treatments
• The mechanisms for development of stomach cancer are unknown. However, there is some indication that the development of stomach cancer may be linked to a diet high in nitrates, salt, and smoked foods and low in vitamin C. The exact effect of these substances is unknown • For unknown reasons, individuals with pernicious anemia have a high incidence of stomach cancer. Pernicious anemia is caused by a malformation of red blood cells NOTE: Pernicious anemia differs from typical anemia, which is a deficiency of red blood cells or hemoglobin.	• Diagnosis must be made by medical professionals • Diagnosis may include: - upper gastrointestinal X-ray - endoscopy (viewing with fiber optic tubes under local anesthetic) • Indications may be: - vague upper abdominal discomfort, sometimes coupled with loss of appetite or weight - unexplained anemia - stomach ulcers that fail to heal with treatment • Treatment may include: - surgery - chemotherapy - radiation

Other disorders

Due to the nature of law enforcement work, peace officers may be at higher risk for the following additional gastrointestinal disorders.

- Nervous stomach
- Colitis (inflammation of the colon)

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Structural Injuries

Introduction

Because of the physical requirements of the job, peace officers are considered at risk for a variety of structural injuries.

Causes, risk factors, and prevention

The following table describes the causes, risk factors, and preventive measures associated with structural injuries.

Causes	Risk Factors	Preventive Measures
• Poor physical conditioning • Poor posture and lifting technique • Major and minor trauma • Degenerative changes • Improper weight control • Stress (emotional and environmental) • Sudden or heavy exertion (e.g., violent physical confrontation, or picking up a heavy duty bag or briefcase) • Positioning equipment on belt	• Improper lifting, twisting, or bending when reacting in emergency situations	• Adequate job training • Proper conditioning • Good flexibility/stability /mobility • Strength exercise program to strengthen lower back and abdominal muscles • Knowledge of lifting limits and proper lifting techniques

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Structural Injuries, Continued

Reducing risk of lower back injury

Many lower back injuries occur because of weak abdominal muscles. While the body posterior (back) is supported by the spine, the anterior (front) has only the rib cage for skeletal support. Only strong abdominal muscles can support the front of the lower body.

Officers can strengthen abdominal muscles and decrease the risk of lower back injury through physical conditioning including abdominal exercises.

Proper lifting

Officers must be physically prepared to do intermittent or sudden heavy work and are sometimes required to perform duties in an awkward or unbalanced position. Because of this, all officers should be familiar with and practice correct lifting techniques to ensure that proper (healthy) body movements become automatic.

When lifting heavy objects, officers should bend their knees, not their backs. This leaves the officer's body with the best possible posture, leverage, and balance.

Chapter Synopsis

Learning need	Peace officers need to understand the common health problems so they may use appropriate risk management techniques to ensure their health and physical fitness.
Cardiovascular disease [32.03.EO5] [32.03.EO8]	Cardiovascular disease covers several disorders that, if untreated, can contribute to coronary heart diseases. More than 750,000 Americans annually become victims of coronary heart disease in the form of heart attacks, also known as myocardial infarction.
Structural injuries [32.03.EO5] [32.03.EO8]	Peace officers are considered at risk for structural injuries because of the requirements of a law enforcement job.
Gastrointestinal disorders [32.03.EO5] [32.03.EO8]	Peace officers are frequently at risk for ulcers, stomach or colorectal cancer.

Workbook Learning Activities

Introduction

To help you review and apply the material covered in this chapter, a selection of learning activities has been included. No answers are provided. However, by referring to the appropriate text, you should be able to prepare a response.

Activity questions

1. Name three diseases or disorders that are common among peace officers. Note why you think officers are at risk for each. List two things officers could do to lessen their risk.

2. A patrol officer's lack of aerobic conditioning and heavy smoking leaves her easily out of breath with minimal exertion. She also frequently complains of structural injuries. How do you think these fitness problems might affect her ability to perform her duties?

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Activity questions (continued)

3. Consider your current lifestyle and fitness level. Objectively assess your risk for cardiovascular disease. Do you know your current cholesterol count and blood pressure? Next, assess your risk for stomach disorders. Explain the rationale for your overall assessments. How could you lower your risks, if at all?

4. Two officers are of equal weight, the same gender, and have similar body types. Both have a cholesterol count of 220, yet one officer is at much higher risk for atherosclerosis and heart attack than the other. Explain how this could be true.

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Activity questions (continued)

5. Describe the progression of the most common type of heart attack. What, if any, symptoms may alert an officer to cardiovascular disease?

6. Why might an officer who eats few fruits and vegetables have an increased risk of colorectal cancer?

Chapter 4

Recognizing and Managing Stress

Overview

Learning need

Peace officers must recognize the causes of stress and how to manage it effectively in order to protect their personal health and ensure their ability to perform their duties.

Learning objectives

The chart below identifies the student learning objectives for this chapter.

After completing study of this chapter, the student will be able to:	E.O. Code
• Explain the signs and symptoms of elevated stress levels	32.04.EO7
• Recognize that substance abuse is an inappropriate strategy for coping with physical and psychological stress	32.04.EO8
• Describe the short and long term effects of abusing: - Alcohol - Tobacco - Caffeine - Supplements/performance enhancing drugs - Prescription, nonprescription, and illegal drugs	32.04.EO9
• Explain the techniques for stress management	32.04.EO13

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Overview, Continued

In this chapter

This chapter focuses on peace officers recognizing and managing stress. Refer to the following chart for specific topics.

Recognizing Stress

[32.04.EO7, 32.04.EO8]

Description

Stress is a natural, nonspecific response of the body to any demand made on it. Stress cannot be eliminated from an officer's daily routine, but understanding the causes of stress is the first step toward managing its effects.

Policing in the community

Extra attention is paid to the physical fitness of officers. Early in their careers, right out of the academy, youth and high motivation make it easy. Young, supple bodies are more resistant to stress and recover quickly from strain. As officers age into the middle and latter years of their careers, wear and tear starts to take its toll. An officer's good physical condition provides a positive image to the community and increases confidence in the agency that serves the community.

Physical response to stress

When placed in a stressful situation, the body's natural biological response is to prepare for "fight or flight." Adrenaline and adrenaline-like product levels can increase dramatically. These products released in the bloodstream cause increases in:

- heart rate
- contractibility of the heart
- a dramatic increase in the consumption of oxygen

Positive response to stress

Not all stress is bad. Stress can heighten an officer's senses and quicken responses in critical situations. In nonemergency situations, a certain amount of stress can also motivate officers to accomplish their goals.

Negative response to stress

Problems can occur when officers fail to effectively manage high stress levels. Chronic unrelieved stress leads to prolonged elevation of the adrenaline-like products in the bloodstream, which can lead to disabling effects.

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Recognizing Stress, Continued

Causes of stress

The causes of stress are numerous and can vary widely by individual. What may cause stress in one officer may be readily dealt with and dismissed by another.

The following table introduces only a few of the possible causes of stress for peace officers.

Cause	Examples
Job Related Situations	• Rotating shifts • Time constraints and workloads • Monotony • Expectations (i.e., requirements to suppress personal emotions in the line of duty) • Emotionally draining experiences • Dealing with other components of the criminal justice system • Internal affairs complaints • Peer pressure • Denied time off/vacation requests • Promotional exams/specialized units • Conflicts with co-workers or supervisors
Extremes in Human Emotions	• Fear • Anger • Frustration • Hostility
Relationships with Others	• Conflicts with spouse, friends, etc. • Family expectations and demands
Other	• Finances • Health

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Recognizing Stress, Continued

Symptoms of stress

Stress is an individual experience, and the symptoms of stress vary by individual. As a result of chronic stress, officers may experience symptoms such as, but not limited to:

- high blood pressure
- headaches
- shortness of breath
- sleeping disorders
- eating disorders
- trembling hands, sweating, dizziness, or nausea
- sexual dysfunctions

NOTE: Suicidal thoughts or suicide attempts are also clear but extreme reactions to stress.

Effects on families

Unfortunately, on-the-job stress frequently affects officers' personal lives as well as their professional lives. Divorce rates are high in the law enforcement profession due in part to:

- job-related stress and anxiety that are brought home
- rotating shift hours
- constant on-call status
- constant threat of officers placing their lives on the line
- relationship indiscretions

Even in families that stay together, stress may be continuous and difficult to manage. Every family member must make extra efforts to recognize stress and manage it appropriately (e.g., seeking help and support from friends and extended family members, obtaining family counseling, etc.).

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Recognizing Stress, Continued

Burnout

Law enforcement is a highly stressful occupation and peace officers may be predisposed to professional **burnout**. In order to avoid burnout, officers must recognize burnout symptoms, understand the warning signs of stress overload and find ways to relieve stress. The following categories have comprehensive lists but they are not fully inclusive since stress can cause burnout in every individual differently.

Burnout Symptoms

- Boredom
- Difficulty relaxing
- Feeling overworked
- Feeling underworked
- Don't make a difference
- Apathetic
- Careless
- Constant stress
- Difficulty concentrating
- Low self-esteem
- Withdrawal
- Unable to leave work at work
- Inability to face the day
- Feeling isolated
- Excessive use of alcohol

Warning Signs of Burnout Overload

- Disruption in sleeping habits
- Change in appetite or diet
- Change in mood, such as a loss of optimism or feeling overwhelmed
- Inability to put stress in a long-term perspective or to see the bigger picture
- Increase in anger or irritability
- Constantly sick
- "Retired on Duty" (ROD)

Managing Burnout

- Maintain a normal routine. This can help you feel more in control of your life
- Improve diet and exercise regularly
- Understand what "Burst Stress" is – Calm to Chaos
- Seek counseling regardless of the stigma
- Seek family and administrative support
- Avoid the "Us vs. Them" mentality
- Educate yourself to the signs and symptoms caused by stress
- Make and keep personal relationships with friends, family and other confidants outside of law enforcement
- Make time for things you enjoy
- Give yourself a break and stay away from things that rile you in times of stress

Substance abuse

Substance abuse is the consumption of substances or quantities of substances that injure the body. *Substance abuse usually takes place when an officer fails to effectively manage stress.* Officers must recognize that substance abuse is an inappropriate coping strategy taken in response to physical and/or psychological stress.

Substances commonly abused by peace officers in response to stress include:

- alcohol
- tobacco
- caffeine, prescription, nonprescription, and illegal drugs
- supplements/performance enhancing drugs

Alcohol Use and Abuse

[32.04.EO9]

Introduction

Alcohol is the most widely used drug in the United States. Alcohol is a depressive or sedative drug that slows the activity of the central nervous system. Ethyl alcohol is the active ingredient in alcoholic beverages.

Mechanism of action

The mechanisms of alcohol's action on the body can vary.

Officers should be aware that alcohol:

- enters the bloodstream rapidly and can be circulated to all parts of the body in minutes
- primarily affects the central nervous system, where it depresses or deadens control centers in the brain, resulting in intoxication
- depresses the brain centers that integrate behavior causing jumbled thoughts, dulled concentration and insight, and dramatic mood swings
- functions as a diuretic, stimulating the kidneys to eliminate more water than is being consumed, resulting in dehydration

NOTE: Since alcohol is taken into the system by drinking, absorption may be slowed by the presence of food in the stomach.

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Alcohol Use and Abuse, Continued

Effects

The effects of alcohol can vary in intensity depending on the circumstances (e.g., with or without food), and the individual (i.e., body size). The following table identifies both short-term and long-term effects of abusing alcohol.

Short-term Effects	Long-term Effects
• Intoxication • Impairment of physical exertion • Impairment of cognitive functioning (judgment, memory, and sensory perception) • Dulled concentration • Dramatic mood swings • Sleepiness, coupled with disrupted sleep patterns • Dehydration	• Addiction (physical and psychological dependence) • Chronic degenerative illnesses such as: - cirrhosis of the liver - heart disease - kidney disease - dementia

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Alcohol Use and Abuse, Continued

Stages of intoxication

Officers should recognize that intoxication is a result of alcohol abuse. Intoxication occurs progressively in six basic stages shown in the table below.

Stage	Description	% Blood Alcohol
Relaxation/ Happiness	The person appears to be elated, talkative, sociable, and relaxed	0.05-0.08
Excitement	The person begins to exhibit emotional and erratic behavior	0.10
Confusion	The person staggers, is disoriented, and moody. Such actions are frequently accompanied by exaggerated fear	0.20
Stupor	Walking and standing are almost impossible, and paralysis is fast approaching	0.40
Comatose	The person is completely unconscious with no reflexes. Respiratory paralysis is highly possible, followed by death	0.50 and over

Alcohol addiction

Addiction is a state of being devoted, habitually or compulsively, to some habit, practice, or pursuit, especially drugs. Physical and psychological addiction is one of the long-term effects of alcohol abuse.

Alcohol addiction may be easy to deny and difficult to recognize because moderate drinking is socially accepted.

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Alcohol Use and Abuse, Continued

Identifying alcohol addiction

One way an officer can identify alcohol dependence is to look at the history of the subject's (or the officer's own) drinking habits.

The following table describes eight symptoms of an alcoholic drinking problem. *If an officer has four or more of these symptoms, it is likely that the officer is an alcoholic.*

Symptom	Description
Preoccupation	The alcohol-dependent person is occasionally preoccupied with the next time they will be able to drink
Increased Tolerance	The alcoholic is able to consume greater amounts of alcohol than the nonalcoholic
Gulping Drinks	The person drinks in a manner that allows the alcohol to act quickly
Drinking Alone	Sociability is not important
Use of Alcohol as a Medicine	Alcoholics often think of alcohol as a panacea (cure all)
Blackout	The alcoholic has difficulty recalling some of the events of the previous day
Protection of the Supply	Sometimes an alcoholic feels more comfortable if they know that alcohol is available. They may ensure that there is a supply at home, in the car trunk or in an office desk, for example
Nonpremeditated use	Alcoholics often drink more than they plan to, or they start drinking without even thinking about it

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Alcohol Use and Abuse, Continued

Long-term alcohol addiction

Long-term alcohol addiction can result in chronic degenerative diseases. These include:

- cirrhosis of the liver
- heart disease
- kidney disease
- dementia
- cancer
- nervous system damage

Tobacco Use and Abuse

Introduction

Tobacco use is the most addictive and dependence-producing form of self-administered gratification known to humans.

Effects of nicotine

All forms of tobacco contain nicotine, a powerful central nervous system stimulant. Nicotine is highly addictive. In addition, it directly affects:

- blood pressure
- heart rate
- skin temperature
- hormone production
- muscle tension
- pain sensitivity

Nicotine addiction

Nicotine is highly addictive, both psychologically and physically. Nicotine use may alter the user's mood by giving the person a false sense of confidence and lessened anxiety. Tobacco users unconsciously try to recreate this feeling again and again.

The physical dependence is also psychologically encouraged by advertising, which often implies that smoking (and sometimes chewing) tobacco is "cool" and is a pleasure to engage in.

Mechanism of action

When nicotine is inhaled it goes directly to the brain, producing a sense of euphoria. Nicotine also constricts the arteries, limiting the body's ability to distribute oxygen needed for normal body functions. The constriction of coronary and cerebral arteries put tobacco users at risk for heart disease and stroke.

When tobacco is smoked, the carbon monoxide also reduces oxygen flow in the blood, compounding cardiovascular and circulatory problems.

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Tobacco Use and Abuse, Continued

Effects

The following table describes the short-term and long-term effects of tobacco use/abuse.

Short-term Effects	Long-term Effects
• Constriction of the arteries • Changes in blood chemistry • Increased heart rate • Elevated blood pressure	• Addiction (physical and psychological dependence) • Cardiovascular disease • Respiratory disease (if tobacco is smoked) • Cancer • Illness and death of others through secondhand smoke • Respiratory disease • Periodontal disease • Impotency

Smoking cessation

Many tobacco users have tried and failed on at least one occasion to quit. This is because nicotine causes marked changes in body chemistry, but does not show dramatic evidence of these changes until use is long term. At that time, serious disease may be present.

Nicotine is physically addictive and quitting tobacco use is more than an act of willpower. It requires physical body readjustment, and it is hard. Over the counter and prescription drugs exist that can help tobacco users quit.

Once a person quits smoking, and if there has been no irreparable lung damage, the lungs of that person will return to near normal within four to five years.

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Tobacco Use and Abuse, Continued

Smoking-related disease

Smoking has been linked to at least three serious, and potentially life threatening diseases. The table below describes smoking as a high risk factor in cardiovascular disease, respiratory disease, and cancer.

Disease	Relationship to Tobacco Use
Cardiovascular	• Smoking is a major risk factor in heart disease. Of 750,000 annual deaths from heart disease, 200,000 are smoking related • Carbon monoxide in smoke passes through the lungs into the bloodstream where it interferes with the ability of red blood cells to carry oxygen, limiting oxygen to the heart • Nicotine makes the heart beat faster, though it constricts arteries. Coupled with the lowered oxygen supply, this results in perfect conditions for a heart attack • In addition, the chemicals in smoke also damage the cardiovascular system by: - damaging artery lining - increasing the likelihood of blood clotting - contributing to plaque buildup in blood vessels - increasing heart rate - increasing blood pressure - raising blood cholesterol levels

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Tobacco Use and Abuse, Continued

Smoking-related disease (continued)

Disease	Relationship to Tobacco Use
Respiratory	• Smokers inhale tars (microscopic particles that form sticky resin-like substances in the lungs). These tars then impair the respiratory system functions • Tars impair cilia (the tiny protective hairs in lungs) resulting in: - smoker's cough - susceptibility to colds - chronic bronchitis - other respiratory infections • Tars contain carcinogenic chemicals that can produce cancer in the tissues they permeate • Smoking is the leading cause of emphysema. Emphysema damages the air sacs in the lungs, gradually destroying lung elasticity. It causes labored breathing and chronic shortness of breath **All smokers will develop emphysema if they continue to smoke and live long enough.**
Cancer	• Smoking is a recognized ***cause*** of cancer of the: - lungs - throat - mouth - esophagus - bladder

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Tobacco Use and Abuse, Continued

Smokeless tobacco and disease

Many smokers erroneously believe that they can eliminate the health risks of tobacco by switching from cigarettes to smokeless tobacco (i.e., chewing tobacco or snuff).

Both chewing tobacco and tobacco snuff supply the body with nicotine. Users are, therefore, still subject to cardiovascular disease and muscle weakness. In addition, officers who use chewing tobacco should know that it has been linked to cancers of the mouth, tongue, and throat.

Snuff causes a breakdown in nasal membranes, leaving users more prone to viral and bacterial infections. It has also been linked to cancerous growths in the sinus passages and throat.

Secondhand smoke

Secondhand smoke contains large amounts of the same toxic chemicals released in the smokers' lungs, such as:

- tar
- nicotine
- benzopyrene

Secondhand smoke comes from two different sources:

- smoke expelled in the air by exhaling smokers
- side stream smoke that drifts up from lit cigarettes, cigars, or pipes

Nearly 85 percent of the smoke in a room is side stream smoke. Side stream smoke from a cigarette, cigar, or pipe has twice the tar, twice the nicotine, and five times the carbon monoxide, as expelled smoke that was inhaled by the smoker.

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Tobacco Use and Abuse, Continued

Health risks of secondhand smoke

According to the U.S. Environmental Protection Agency, secondhand smoke causes 3,800 lung cancer deaths each year. Other studies have estimated that 50,000 Americans die each year as a result of secondhand smoke, 75 percent of these from heart disease.

Secondhand smoke poses a health risk for healthy nonsmokers and causes:

- eye irritation
- nose irritation
- throat irritation
- acute respiratory irritation

In addition, secondhand smoke may pose an even greater risk to individuals with asthma, heart disease, or angina.

Risks to children

The harmful effects of secondhand smoke are particularly critical for children, especially those who have one or more smoking parents.

Before smoking in front of their children, smokers should consider that one of the greatest risks is their children are more likely to become smokers themselves.

Caffeine Use and Abuse

Introduction

While caffeine, in moderation, can be acceptable, overuse and abuse can cause serious health problems.

Caffeine

Nearly everyone ingests at least some **caffeine** daily. It is present in:

- coffee
- tea
- chocolate
- some headache remedies
- many soft drinks
- energy drinks

Caffeine use

The following table describes the short-term and long-term effects of caffeine use.

Short	Long

• Wards off drowsiness and increases alertness
• Increased work capacity and physical activity
• Depending on the amount consumed, caffeine can:
  - temporarily step up heartbeat
  - temporarily step up metabolism
  - increase stomach acid
  - increase urine production
  - dilate some blood vessels while constricting others
• Causes irregular heart beat
	• Long-term effect of too much caffeine may contribute to:
	  - pancreatic cancer
	  - high blood cholesterol
	  - birth defects
	• Since caffeine is mildly habit forming, some caffeine drinkers may experience withdrawal symptoms 12 to 16 hours after their final dose. These may include:
	  - drowsiness
	  - headache
	  - lethargy
	  - irritability
	  - the “blues”
	  - nausea

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Caffeine Use and Abuse, Continued

Caffeine abuse

Overuse of caffeine can produce the following results:

- Trembling
- Nervousness
- Chronic muscle tension
- Irritability
- Throbbing headaches
- Disorientation
- Sluggishness
- Depression
- Insomnia

Drug Use and Abuse

Introduction

A person who uses a drug to seek temporary relief usually achieves this by taking the correct dosage that the doctor and/or label prescribe. Over time a person can go from using a drug for therapeutic reasons (e.g., a pain killer), to becoming dependent on that drug in order to function.

Drug abuse

Drug abuse usually results from taking an excess dosage of a given drug. In more serious situations, the "recreational use" can lead to serious drug abuse and addiction, and in extreme circumstances, to death from an overdose.

Drug addiction

Addiction is the physical dependence on, and increased tolerance of, a drug. Addiction becomes apparent when:

- the body accommodates the routine presence of the drug
- the body begins to rely on the drug
- tolerance to the drug builds
- more of the drug is needed to trigger the same effect, and finally
- the body becomes physically addicted to the drug

Drug dependence

Dependence is the psychological or physical state resulting from the interaction between the body and the drug that will alter, over time, the production of certain hormones and neurotransmitters. Very quickly, the user simply can't cope without the drug.

Physical and/or psychological withdrawal symptoms become evident if the drug is not available; the user is now dependent on the drug to achieve a sense of well being.

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Drug Use and Abuse, Continued

Drug classifications

The chart below describes the different pharmacological classes for prescription, nonprescription, and illegal drugs.

Class	Description	Effect on the Body	Examples
Stimulants	Drugs that arouse activity, increase vitality, and promote a sense of well-being	• Impairment by overstimulating the brain, accelerating the heart rate and respiration, and elevating blood pressure	• Cocaine • Ampheta-mines • Metham-phetamines
Hallucinogens	Drugs that induce intense emotional feelings characterized by magnification of sensory perceptions and possible visual hallucinations at relatively low doses	• Impair the user's ability to perceive the world as it really is and often produce a dazed appearance	• LSD • MDMA (ecstasy) • Peyote (mescaline) • Psilocybin

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Drug classifications (continued)

Class	Description	Effect on the Body	Examples
Opioids (opiates)	A category of drugs called narcotic analgesics which are synthetic or natural opium derivatives	• Used to relieve pain and affect a comparatively weak general central nervous system depression (sedation) • Very addictive; can produce withdrawal symptoms when stopped after chronic administration	• Opioids: - morphine - codeine - heroin • Opiates: - demerol - methadone - darvon
Marijuana	Derivatives of the marijuana plant	• Can lead to the impairment of the attention process • Produces as its most prominent effect changes in time sense, an increase in appetite, and a floating sensation	• Marijuana • Hashish/hash oil • Synthetic (marinol)

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Drug classifications (continued)

Class	Description	Effect on the Body	Examples
Depressants	A large number of different drugs, all of which are named for the most prominent property of dampening CNS activity while carrying relatively weak analgesic effects	• Slows the operation of the brain and other parts of the central nervous system (CNS)	• Tranquilizers • Barbiturates • Anti-anxiety agents (e.g., Librium, Valium, Xanax, etc.)
Inhalants	Substances that are inhaled through the lungs (lower respiratory system)	• Impairs performance by blocking the passage of oxygen to the brain, producing disorientation and slurred speech • Most prominent psychological actions of these drugs at the usual doses are feelings of excitement and confusion	• Solvents • Aerosols • Nitrates • Anesthetics (nitrous oxide, ether, chloroform)

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Drug classifications (continued)

Class	Description	Effect on the Body	Examples
Phencyclidine	Synthetic drug which has many unpredictable effects; a strong analgesic; most commonly smoked and may be absorbed through the skin	• Changes in sensory perceptions and visual hallucinations similar to those described for the hallucinogens • Can act as a stimulant, depressant, or hallucinogen, and can cause bizarre and sometimes violent behavior	• PCP and its analogs • Ketamine

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Drug classifications (continued)

Class	Description	Effect on the Body	Examples
Anabolic-Androgen Steroids	Anabolic-Androgen Steroids are a family of compounds that include the male hormone, testosterone, and a large number of synthetic compounds structurally related to testosterone.	• Increase in body weight, muscle mass, power and strength when combined with intense strength and power training • Can cause serious and potentially life threatening side effects, including cancer cardiovascular problems due to high blood pressure and cholesterol imbalance, gynecomastia	• Dianabol, Human Growth Hormone, Winstrol V, Deca-Durabolin, Anadrol, Depo-Testosterone, Equipoise, etc

NOTE: Nutritional supplementation as discussed in chapter 2 (page 2-17) is different from the use of performance enhancing drugs. There are many adverse legal and health implications to the use of performance enhancing drugs.

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Drug Use and Abuse, Continued

Prescription and nonprescription drugs

Many prescription and nonprescription drugs carry warning labels cautioning users about adverse effects. Several labels caution the user against operating machinery or motor vehicles while taking the medication since it can cause drowsiness.

Some common medications that can cause drowsiness are:

- hypertension (high blood pressure) medicines
- antibiotics
- antihistamines
- over-the-counter drugs such as cold, sinus, or hayfever preparations

Additional effects

The effects of prescription and nonprescription drugs can vary greatly depending on the individual drug. The following table describes just some of the potential short-term and long-term effects of abusing prescription and over the counter medications.

Short-term Effects	Long-term Effects
• Mood alteration • Impaired judgment • Impaired critical thinking ability • Lessened alertness or drowsiness	• Addiction • Habituation (tolerance) requiring higher doses to produce the desired effect

Illegal drugs

The nature of their role in law enforcement can place peace officers in the proximity of a number of controlled or illegal drugs. Along with constituting a criminal act, use of illegal drugs can affect an officer's cognitive processes (perception and attention). This can lead to negative effects on learning, motor skills, and performance.

Some illegal drugs may also linger in an officer's body system for days or weeks with the drug's effects recurring suddenly for no apparent reason.

Stress Management

[32.04.EO13]

Introduction

Some methods of stress management require professional assistance, others can easily be performed by officers, sometimes with family or friends.

Lifetime fitness

Some amount of stress is normal and natural in a peace officer's life. But all officers should make an effort to identify and alleviate stressors in their lives that go beyond normal and begin to affect them negatively.

Officers who develop a lifestyle conducive to lifetime fitness, featuring proper exercise, nutrition, and fulfilling personal time, are likely to find that they naturally perform several stress relieving or managing techniques.

Failure to minimize and properly manage stress can affect officers personally and professionally. Chronic stress can degrade officer performance and endanger the safety of self and others.

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Stress Management, Continued

Stress management

Recognition of personal stress thresholds alone is not enough. Officers may need to seek specific methods and techniques for managing such stress.

The following table identifies a number of techniques for managing stress.

Technique	Examples
Lifestyle Modifications	• Maintain affiliation with family, friends, and community groups • Regular exercise • Proper nutrition • Getting sufficient sleep • Removal from the stressful activity or environment, if possible • Prioritization of work hours, if possible • Taking vacations • Engaging in recreation or play activities • Engaging in hobbies, reading, or games
Professional Interventions	• Professional and peer counseling • Relaxation techniques or exercises • Participation in religious activity • Biofeedback • Meditation • Massage therapy • Acupuncture therapy

Chapter Synopsis

Learning need	Peace officers must recognize the causes of stress and how to manage it effectively in order to protect their personal health and ensure their ability to perform their duties.
Recognizing stress [32.04.EO7, 32.04.EO8]	Stress is a natural, nonspecific response of the body to any demand made on it. As a result of chronic stress, officers may experience tell-tale symptoms.
Alcohol abuse [32.04.EO9]	Alcohol is the most widely used drug in the United States. Alcohol is a depressive or sedative drug that slows the activity of the central nervous system. Ethyl alcohol is the active ingredient in alcoholic beverages.
Tobacco abuse [32.04.EO9]	Tobacco use is the most addictive and dependence-producing form of self-administered gratification known to humans.
Caffeine abuse [32.04.EO9]	While caffeine, in moderation, can be acceptable, overuse and abuse can cause serious health problems.
Drug abuse [32.04.EO9]	A person who uses a drug to seek temporary relief usually achieves this by taking the correct dosage that the doctor and/or label prescribe. Over time a person can go from using a drug for therapeutic reasons (e.g., a pain killer), to becoming dependent on that drug in order to function.
Stress management [32.04.EO13]	Some amount of stress is normal and natural in a peace officer's life. But all officers should make an effort to identify and alleviate stressors in their lives that go beyond normal and begin to affect them negatively.

Workbook Learning Activities

Introduction

To help you review and apply the material covered in this chapter, a selection of learning activities has been included. No answers are provided. However, by referring to the appropriate text, you should be able to prepare a response.

Activity questions

1. In order to effectively manage stress, officers must first attempt to identify the stressors in their personal lives. Try to honestly identify the current stressors in your personal life. Now anticipate stressors that are unique to law enforcement, and list stress management techniques that apply to both.

2. An officer suspects that his partner is under heavy stress, but that she does not consciously recognize it. He bases this on their discussions of her family conflicts and increased pressure at work. What symptoms might indicate that his suspicion is correct? If the officer shows these symptoms, what, if any, action should her partner take? Explain your response.

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Activity questions (continued)

3. Why is smoking not just the "smoker's business?"

4. What is your favorite stress management technique? Describe why it is effective for you.

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Activity questions (continued)

5. Why do you think peace officers may be at high risk for alcohol abuse? What symptoms could indicate that an officer has an alcohol problem?

6. List all the prescription and nonprescription medications you have taken in the last 30 days. What were the potential adverse effects for each? (If unsure, check the medication warning labels.) What precautions would you take to prevent such adverse effects from hindering your performance as a peace officer?

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Activity questions (continued)

7. Why do steroids have such an appeal with peace officers?

Glossary

Introduction	**The following glossary terms apply only to Learning Domain 32: Lifetime Fitness**
acceleration and agility	the ability to increase speed from static or after directional changes
active recovery	recovery betweens sets, repetitions, and intervals may require rest, which is commonly referred to as active recovery
acute injuries	physical injuries that result as the consequence of a specific event, mishap, or accident
addiction	a state of being devoted, habitually or compulsively, to some habit, practice, or pursuit, especially drugs
aerobic	aerobic training occurs when oxygen is utilized during maximal work lasting more than two to three minutes and all sub-maximum work
aerobic activity	aerobic activity refers to the process of producing work energy by supplying the muscles with oxygen, while the work is occurring. Examples of aerobic activity are maximal work lasting more than 2-3 minutes, and all sub-maximal work
anaerobic	anaerobic training is shorter than aerobic training in duration (less than two minutes) and requires energy from anaerobic sources. Anaerobic energy sources enable the body to perform brief near maximal muscular activity
anaerobic activity	anaerobic activity refers to the process of producing work energy without supplying the muscles with oxygen, while the work is occurring. Examples of anaerobic activity include short duration, maximal effort work lasting less than three minutes

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Glossary, Continued

arteriosclerosis	a general term that includes a number of blood vessel diseases including atherosclerosis and the change in shape of blood vessels that commonly occurs with age
atherosclerosis	a condition in which a fatty substance called plaque collects on the inside walls of the arteries, resulting in a narrowing of the arteries and reduced blood and oxygen flow
body composition	the proportion of fat tissue to overall body mass in the human body; proportion of fat compared with lean tissue in the body
burnout	is the psychological term for the experience of long-term exhaustion and diminished interest
caffeine	is an alkaloid which acts as a central nervous stimulant commonly found in coffee, soft drinks, and energy drinks
cardiovascular	the ability of the circulatory and respiratory systems to supply during sustained physical activity
cholesterol	a waxy, fat-like substance manufactured by the liver and found in all tissues; an important part of the normal system of blood fats found in humans and animals
chronic injuries	injuries that are usually the consequence of overtraining or overuse; injuries that result from several exercise sessions of doing too much too soon rather than from one incident; may also occur when a person's body mechanics are abnormal

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Glossary, Continued

complete protein	a protein containing all of the eight essential amino acids
cooper institute®	**About The Cooper Institute®** Established in 1970 by Kenneth H. Cooper, MD, MPH, The Cooper Institute is a 501(c)(3) nonprofit dedicated to health research and education, housing one of the world's largest databases on exercise and health. Each year The Cooper Institute (CI) develops engaged learners in fitness and health with its courses and nationally accredited Personal Trainer Certification exam. CI offers web-based tools for schools to track and report on youth fitness and nutrition: FITNESSGRAM® and NutriGram®. Eat better, move more, and live well with TodayIWill.com which provides personalized weight loss skills to help make lasting changes. For more information, visit **CooperInstitute.org**.
core	the bodily region bounded by the abdominal wall, hips, glutes, the lower back and the diaphragm and its ability to stabilize the body during movement (knees to midchest, front and back)
electro-cardiogram	graphic printout of heart action
essential amino acids	the eight amino acids that the body cannot produce by itself
flexibility	the ability to move a body part (usually a joint or limb) through a full range of motion (ROM)
frequency	how often exercise sessions occur in a given week

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Glossary, Continued

hydrogenated	refers to fats that are solid at room temperature (e.g., meat fat, butter, lard, margarine, bacon grease, cocoa butter)
hypertension	high blood pressure
intensity	the stress level at which a person is exercising; speed or pace of an exercise
lifetime fitness	commitment to a lifestyle that supports the development and maintenance of good physical and mental health and reduces the risk of illness or injury
lipoproteins	combinations of protein and lipids (fat or waxy substances); protein packets that transport cholesterol through the bloodstream
mobility	the ease with which a joint or series of joints is able to move before being restricted by the surrounding structures. Joint mobility is determined by the ligaments, joint capsule, musculature, and the size and shape of the bones within the joint
muscular endurance	the ability of a muscle to do continuous work over an extended period of time
muscular power	the ability of a muscle or muscle group to exert a maximum amount of force in the shortest period of time
muscular strength	the maximum force that a muscle can exert at one time focuses on a one-time maximum muscular exertion

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Glossary, Continued

nutrition	the science of nourishing the body properly, including providing for its growth, maintenance, and repair
physical conditioning	the systematic application of the seven key principles of, specificity, frequency, intensity, volume, periodization/program design and progression to an officer's training activities in order to improve muscular fitness, flexibility, body composition, and cardiovascular endurance
periodization/ program design	organization of training into basic workable units
progression	a gradual and systematic increase of the workload over a period of time
recovery	period of time immediately after exercise and prior to the next bout of exercise. Intended for muscle, metabolic recovery, and adaptation
rhabdomyolysis	rhabdomyolysis occurs when the muscle cells membranes break down due to damage from doing too much work and their contents (mostly proteins & potassium) leak into the blood stream and then spill over into the urine making it turn brown (like iced tea or "Coca Cola")
stability	the ability of a joint or body region to withstand shock and movement without being dislocated or otherwise injured. Stability depends on a number of factors, including the strength of the ligaments that bind the bones together, and the strength of muscles associated with the joint
specificity	selecting an exercise activity that matches the chosen performance goal

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Glossary, Continued

stress	a natural, nonspecific response of the body to a demand made on it; body's natural biological preparation for "fight or flight"
substance abuse	the consumption of substances or quantities of substances that injure the body
training heart rate range	conditioning range for improving cardiovascular fitness; the range calculated as 70% to 85% of a person's maximum heart rate (220 - age) minus their resting heart rate
ulcer	an open sore in the lining of the stomach or gastrointestinal tract that heals slowly or will not heal on its own
volume	volume refers to the amount of time/load devoted to the training phase of exercise. Does not include warm-up and recovery