

Getting Physically Prepared for the Naval Academy

Physical education is an important part of the program at the Naval Academy. To ensure that you are physically prepared for Plebe Summer, you are encouraged to start a program designed to help develop cardiovascular endurance and upper body and core strength. We have provided you with a sample program at the back of this pamphlet and a workout chart. Listed below are a few examples of some of the physical requirements of Plebe Summer to help you prepare for the types of activities in which you will be participating:

- *90 minutes, five days per week of strenuous physical calisthenics to increase cardio-respiratory fitness, muscular strength, and endurance, flexibility and confidence.*
- *Runs up to 4.5 miles at a 7-8-minute per mile pace, interval and sprint training.*
- *Obstacle and endurance courses that test balancing, leaping, climbing and team building skills.*
- *Hand-to-Hand training that incorporates martial arts, boxing, and wrestling.*
- *Climbing Wall training that involves upper body muscular strength and endurance, team building, and acclimatization to heights.*

Do not leave all of your preparation to the last minute, as you may end up sidelined with a preventable injury during Plebe Summer. It is imperative that you begin the recommended exercise routine, or one similar to it, NOW! Some common injuries historically seen during Plebe Summer, such as shin splints and minor foot, leg and back injuries related to being out of shape, can be prevented by your preparation beforehand.

Upon arrival, a Physical Readiness Test (PRT) will be administered to determine whether a Midshipman meets the minimum standards of physical fitness for Plebe physical training. Failure to pass this test will result in assignment to a remedial program. At the end of Plebe Summer and during each semester, each Midshipman is required to pass the USNA PRT. The test consists of two minutes of push-ups conducted on 2 second cadence, a timed isometric plank-hold position followed by a timed 1.5 mile run. Passing the PRT every semester is a requirement for service at the Naval Academy. **Failure to pass the PRT may result in separation from the Naval Academy.**

For your information, the maximum (and minimum) scores for the PRT are as follows:

- Female: Push-ups: 45 (20), Plank: 4:20 (1:45), 1.5 mile run: 9:35 (12:40)
- Male: Push-ups: 60 (35), Plank: 4:20 (1:45), 1.5 mile run: 8:15 (10:30)

Upon reporting for Plebe Summer, you should be able to swim a minimum of 100 yards utilizing any stroke and tread water for 15 minutes. Failure to complete these tasks will result in assignment to the swim remedial program. Show up in shape, bring comfortable shoes, and most importantly ...

Stick with the program!

For questions or additional information, visit the USNA Physical Education Department website at USNA.edu/PEDept

**Table 1. Basic Recommended Exercise Routine
14 Weeks-to-Plebe Summer**

Week	Mon	Tues	Wed	Thurs	Fri	Sat
1 Low intensity	20 min walk/jog Stretch	20 min cardio (bike, row, swim) 1 min test: PU and 1:30 FP	20 min walk/jog Stretch	20 min cardio (bike, row, swim) 4 x 15 sec PU 5 x 15 sec FP	Run 25 mins Stretch	30 min cardio (bike, row, swim)
2 Low intensity	25 min walk/jog -Stretch	25 min cardio 5 x 15 sec PU 5 x 15 sec FP	25 min walk/jog Stretch	25 min cardio 4 x 15 sec PU 5 x 15 sec FP	Run 30 mins Stretch	30 min cardio
3	Hard: 6 x 400m	25 min cardio 2 supersets: 30 sec PU; 30 sec FP, 30 sec SP	Steady Hard: 2 miles	25 min cardio PU and FP Ladder #1	Steady: 3 miles	PU 5x10 FP 2x30 sec
4	Hard: 3 x: [800m, 400m]	PU and FP Ladder #1 Bird Dogs (BD) 1x20	Steady Hard: 2 x 1600m	25 min cardio PU 5x15 SP 3x15 sec FP 3x30 sec	Steady: 3 miles	30 min cardio 45 sec cadence PU 2 x 45 sec FP
5	Hard: 5 x 800m	30 min cardio Cadence PU: 1 x 45 sec 1x30 sec FP Ladder #2	3 x (5 min. Hard / 2 min. Easy)	25 min cardio PU 5x20 FP 3x30 sec BD 2x20	26 min. steady run	PU and FP Ladder #2
6	Hard: 3 x 1000m	30 min cardio PU 5x20 FP Ladder #2	Steady Hard: 2 miles Finish Fast	30 min cardio PU and SP Ladder #2	Steady: 3 miles	PU 5x20 BD 2x20 Pull-ups 2x max reps plus 2 sets of negatives
7	Hard: 1600m, 1200m, 800m, 400m	30 min cardio 3 sets: 30 sec max perfect PU; 30 sec FP, 30 sec SP	5 x (3 min Hard / 2 min Easy)	30 min cardio PU and FP Ladder #3	30 min. steady run	PU 5x25 FP 3x30 sec BD 4x15 Pull-up 3xmax
8	Hard: 8 x 400m	30 min cardio PU and FP Ladder #3 BD 4x15	Steady Hard: 2 x 1600m	PU 4x25 FP 3x30 sec SP 2x20 sec 3 x max pull-ups	Steady: 3 miles	30 min cardio 3 sets: max PU, FP 1 min & pull-ups

Week	Mon	Tues	Wed	Thurs	Fri	Sat
9	Hard: 2 x 1200m	30 min cardio PU 5x25 FP 4x30 sec SP 2x30 sec Pull-up 3x max	2 miles at TP	PU and FP Ladder #3 BD 4x15	1.5 Mile Trial + 30 min cardio	3 sets: max PU, FP 1 min, & pull-up
10	Hard: 6 x 800m	Cadence PU: 2x45 sec, FP Ladder #3	8 x (2 min. Hard / 2 min. Easy)	PU and FP Ladder #2 BD 4x15	Steady: 3 Miles	PU 5x25 FP 4x30 sec SP 2x30 sec Pull-up 3xmax
11	Hard: 400m, 600m, 800m, 800m, 600m, 400m	30 min cardio 3 sets: max PU, FP 1 min, & pull-up	Steady: 2 miles	30 min cardio PU and FP Ladder #3 PU and FP Ladder #1	Steady: 3 miles	35 min cardio PU and FP Ladder #2 BD 4x15 Pull-up 3xmax
12	Hard: 800m, 1600m, 400m, 400m	30 min cardio PU and FP Ladder #3 BD 4x20	Steady: 2 miles Finish Fast	35 min cardio PU 4x30 FP 3x45 sec SP 2x45 sec Pull-up 3xmax	Steady: 3 miles Finish Fast	35 min cardio 3 sets: max PU, FP 1 min, & pull- ups
13	Hard: 3 x 1600m	35 min cardio PU 5x25 FP 4x35 sec SP 2x45 sec Pull-up 3xmax	Steady: 2 miles	35 min cardio PU and FP Ladder #3 BD 4x15	Steady: 3 miles	40 min cardio Cadence PU 2x45 sec FP Ladder #3
14	Hard: 6 x 400m	4 sets: 30 sec PU 45 sec FP 45 sec SP	2 miles easy	PU and FP Ladder #2 BD 4x20	1.5 Mile Test	Active Recovery Hike, Swim, Bike, Row

Explanation of Table 1:

PU = Push-ups (Cadence is specified when applicable. Otherwise, execute clean, proper form push-ups as recommended.)

FP = Front plank

SP = Side plank (Always work both sides of the body. Therefore, if the workout calls for 2 sets, you will conduct 4 sets total (2 on each side).)

BD = Bird Dogs (Always alternate: right leg and left hand extension, followed by left leg/right arm extension.)

Rest interval should be short between all sets, avoiding full recovery between exercises.

For more information on the run, cardio, and strength training program, read the following enclosure (1). It includes the “Ladders” (Table 6), recommended rest intervals, warm-up drills, stretching, and best practices for optimal training. Most importantly: always warm up prior to engaging in intense exercise! Lastly, static stretching should be completed for all major muscle groups after each workout for optimal recovery and injury prevention.

Enclosure (1). USNA Human Performance Lab

1.5 Mile Training Program: 3 Quality Runs

This conditioning program is for candidates training for the 1.5 mile run. It is designed for those who currently exercise three to five days per week and run at least two days per week.

Base Fitness. Before starting the training program, it is suggested that candidates develop a base level of fitness and regular exercise to reduce their risk of a running related injury. This conditioning program is an intense training program. You are encouraged to follow the base training sequence for two to three weeks prior to starting the training program. It is suggested that you start with the shorter duration of the time range and gradually increase the time of your runs during the two to three week base period.

This conditioning program is designed primarily to improve running speed (and performance time) while minimizing the risk of a running-related injury. While this approach may seem minimal in regards to running, it does not mean "train less." This conditioning program is intended to be realistic (not overly time demanding) and effective. Cross training and resistance training are not only encouraged, they are integral to the program, promoting whole-body health and fitness.

High Quality Training. After establishing some base fitness, complete Run Workout #1 on Monday, Run Workout #2 on Wednesday and Run Workout #3 on Friday. You can do the three key run workouts in any order throughout the week; however, allow at least one day off from running between the key run workouts. In addition to the three key run workouts, it is suggested that you complete three aerobic cross-training sessions and three strength training workouts. Here is an example of a recommended training sequence:

Monday	Run Workout #1
Tuesday	Strength Training and 30-minute high-intensity cycling workout
Wednesday	Run Workout #2
Thursday	Strength Training and 30-minute high-intensity cycling workout
Friday	Run Workout #3
Saturday	Strength Training and 30-minute high intensity cycling workout suggested
Sunday	Active Rest (walk, swim, hike)

Comments about the Run Workouts:

For the Monday and Wednesday run workouts include a 10- to 15-minute warm-up with easy jogging. After your warm-up, complete four (4) striders where you gradually accelerate for 80 meters until you reach approximately 90% of full speed and then decelerate over the final 10 meters. Rest for 30 seconds, then repeat in the opposite direction.

For the Monday and Wednesday run workouts, the recovery interval (RI), which is indicated in parentheses, may be a specified timed interval or a distance that you walk/jog. One note of caution: these run workouts are intense but should not be "races." While you can possibly run faster than the indicated target time or pace for the specified distance, in an attempt to minimize the risk of a running-related injury, it is suggested that you not complete the workouts with maximal effort. After your run workouts, a cool down is important. Jog easy for 10 minutes followed by static stretching (recommended stretches included in this packet).

1.5 Mile Training Program: The 3 Quality Runs

The workouts for the three Key Runs include designated run distances and recovery intervals; recovery intervals (RI) are indicated in parentheses. Some of the distances are different from “typical” track workouts. These workouts should challenge you physically, as well as your ability to stay focused.

Key Runs #1 and #2 begin with a 10 – 15 minute warm-up and end with 10 minutes easy for a cool-down

RI = Recovery Interval; which may be a timed recovery interval or a distance that you walk/jog

Paces: See Step 2 below to determine your target times and target paces (TP = Tempo Pace)

Table 2. 12 Week Running Program
In-depth, including recommended rest intervals
(Refer to Tables 3 and 4 to determine all of you paces, including your TP)

Week	Key Run #1*	Key Run #2*	Key Run #3
1	6 x 400m (200m walk/jog RI)	2 miles at TP	3 miles at TP + 30
2	3 x [800m (400m RI), 400m (200m RI)]	2 x [1600m, (400m RI)]	3 miles at TP + 20
3	5 x 800m (2 min. RI)	3 x (5 min. Hard / 2 min. Easy)	26 min. steady run
4	3 x 1000m (400m walk/jog RI)	2 miles: 1 st mile at TP 2 nd mile at TP - 10	3 miles at TP + 20
5	1600m, 1200m, 800m, 400m (400m walk/jog RI after each distance)	5 x (3 min. Hard / 2 min. Easy)	30 min. steady run
6	8 x 400m (90 sec RI)	2 x [1600m, (400m RI)]	3 miles at TP + 15
7	2 x 1200m (2 min RI)	2 miles at TP	1.5 Mile Trial
8	6 x 800m (400m walk/jog RI)	8 x (2 min. Hard / 2 min. Easy)	3 Miles at TP + 10
9	400m, 600m, 800m, 800m, 600m, 400m (90sec RI after each run)	2 miles at TP- 10	3 miles at TP
10	800m, 1600m, 400m, 400m (400m jog RI after each distance)	2 miles: 1 st mile at TP – 10 2 nd mile at TP – 15	3 miles: 1 st mile at TP + 10 2 nd mile at TP 3rdmile at TP – 10
11	3 x 1600m (400m walk/jog RI)	2 miles at TP - 15	3 Miles at TP
12	6 x 400m (60 sec RI)	2 miles easy No additional warm-up or cool-down.	1.5 Mile Test

* begin with a 10 – 15 minute warm-up and end with 10 minutes easy for a cool-down

High Intensity Training. This High Intensity Training program is based on a person’s current level of running fitness (**not their goal time**) and is designed primarily to improve running speed (and performance time) while minimizing the risk of a running-related injury.

Step 1. Run 1.5 mile for time (to establish current running fitness); **1.5 Mile Time** _____

Step 2. Determine your target training times and paces by completing Table 3. (Refer to Table 4 to in order to fill in Table 3.)

Table 3. Your Personal Target Training Times and Paces

Run Workout #1 target times	Tempo pace (TP) _____/mile (see Table 4)	
400m _____	Run Workout #2 target paces	Run Workout #3 target paces
600m _____	TP – 10 sec = _____/mile	TP + 10 sec = _____/mile
800m _____	TP – 15 sec = _____/mile	TP + 15 sec = _____/mile
1000m _____		TP + 20 sec = _____/mile
1200m _____		TP + 30 sec = _____/mile
1600m _____		

Step 3. Complete the 3 key run workouts each week for the next 6-12 weeks with your primary focus of running the workout distances at your target time / pace.

Table 4. Target Training Times and Paces (based on current 1.5 mile run time)

1.5 Mile Time	1 Mile	Key Run #1 Target Times						Tempo Pace min./mile pace
		400m	600m	800m	1000m	1200m	1600m	
0:08:00	0:05:20	0:01:05	0:01:41	0:02:20	0:02:57	0:03:37	0:05:00	0:05:35
0:08:10	0:05:27	0:01:07	0:01:44	0:02:23	0:03:01	0:03:42	0:05:07	0:05:42
0:08:20	0:05:33	0:01:08	0:01:46	0:02:27	0:03:05	0:03:48	0:05:13	0:05:48
0:08:30	0:05:40	0:01:10	0:01:49	0:02:30	0:03:10	0:03:53	0:05:20	0:05:55
0:08:40	0:05:47	0:01:12	0:01:51	0:02:33	0:03:14	0:03:58	0:05:27	0:06:02
0:08:50	0:05:53	0:01:13	0:01:54	0:02:37	0:03:18	0:04:03	0:05:33	0:06:08
0:09:00	0:06:00	0:01:15	0:01:56	0:02:40	0:03:22	0:04:07	0:05:40	0:06:15
0:09:10	0:06:07	0:01:17	0:01:59	0:02:43	0:03:26	0:04:13	0:05:47	0:06:22
0:09:20	0:06:13	0:01:18	0:02:01	0:02:47	0:03:30	0:04:17	0:05:53	0:06:28
0:09:30	0:06:20	0:01:20	0:02:04	0:02:50	0:03:34	0:04:22	0:06:00	0:06:35
0:09:40	0:06:27	0:01:22	0:02:06	0:02:53	0:03:39	0:04:27	0:06:07	0:06:42
0:09:50	0:06:33	0:01:23	0:02:09	0:02:57	0:03:43	0:04:32	0:06:13	0:06:48
0:10:00	0:06:40	0:01:25	0:02:11	0:03:00	0:03:47	0:04:37	0:06:20	0:06:55
0:10:10	0:06:47	0:01:27	0:02:14	0:03:03	0:03:51	0:04:43	0:06:27	0:07:02
0:10:20	0:06:53	0:01:28	0:02:16	0:03:07	0:03:55	0:04:48	0:06:33	0:07:08
0:10:30	0:07:00	0:01:30	0:02:19	0:03:10	0:03:59	0:04:53	0:06:40	0:07:15
0:10:40	0:07:07	0:01:32	0:02:21	0:03:13	0:04:03	0:04:58	0:06:47	0:07:22
0:10:50	0:07:13	0:01:33	0:02:24	0:03:17	0:04:08	0:05:03	0:06:53	0:07:28
0:11:00	0:07:20	0:01:35	0:02:26	0:03:20	0:04:12	0:05:08	0:07:00	0:07:35
0:11:10	0:07:27	0:01:37	0:02:29	0:03:23	0:04:16	0:05:13	0:07:07	0:07:42
0:11:20	0:07:33	0:01:38	0:02:31	0:03:27	0:04:20	0:05:17	0:07:13	0:07:48
0:11:30	0:07:40	0:01:40	0:02:34	0:03:30	0:04:24	0:05:23	0:07:20	0:07:55
0:11:40	0:07:47	0:01:42	0:02:36	0:03:33	0:04:28	0:05:27	0:07:27	0:08:02
0:11:50	0:07:53	0:01:43	0:02:39	0:03:37	0:04:32	0:05:33	0:07:33	0:08:08
0:12:00	0:08:00	0:01:45	0:02:41	0:03:40	0:04:37	0:05:38	0:07:40	0:08:15
0:12:10	0:08:07	0:01:47	0:02:44	0:03:43	0:04:41	0:05:43	0:07:47	0:08:22
0:12:20	0:08:13	0:01:48	0:02:46	0:03:47	0:04:45	0:05:48	0:07:53	0:08:28
0:12:30	0:08:20	0:01:50	0:02:49	0:03:50	0:04:49	0:05:53	0:08:00	0:08:35
0:12:40	0:08:27	0:01:52	0:02:51	0:03:53	0:04:53	0:05:58	0:08:07	0:08:42
0:12:50	0:08:33	0:01:53	0:02:54	0:03:57	0:04:57	0:06:03	0:08:13	0:08:48
0:13:00	0:08:40	0:01:55	0:02:56	0:04:00	0:05:01	0:06:08	0:08:20	0:08:55
0:13:10	0:08:47	0:01:57	0:02:59	0:04:03	0:05:06	0:06:13	0:08:27	0:09:02

1.5 Mile Time	1 Mile	Key Run #1 Target Times						Tempo Pace min./mile pace
		400m	600m	800m	1000m	1200m	1600m	
0:13:20	0:08:53	0:01:58	0:03:01	0:04:07	0:05:10	0:06:18	0:08:33	0:09:08
0:13:30	0:09:00	0:02:00	0:03:04	0:04:10	0:05:14	0:06:22	0:08:40	0:09:15
0:13:40	0:09:07	0:02:02	0:03:06	0:04:13	0:05:18	0:06:28	0:08:47	0:09:22
0:13:50	0:09:13	0:02:03	0:03:09	0:04:17	0:05:22	0:06:33	0:08:53	0:09:28
0:14:00	0:09:20	0:02:05	0:03:11	0:04:20	0:05:26	0:06:38	0:09:00	0:09:35
0:14:10	0:09:27	0:02:07	0:03:14	0:04:23	0:05:30	0:06:43	0:09:07	0:09:42
0:14:20	0:09:33	0:02:08	0:03:16	0:04:27	0:05:35	0:06:48	0:09:13	0:09:48
0:14:30	0:09:40	0:02:10	0:03:19	0:04:30	0:05:39	0:06:53	0:09:20	0:09:55
0:14:40	0:09:47	0:02:12	0:03:21	0:04:33	0:05:43	0:06:58	0:09:27	0:10:02
0:14:50	0:09:53	0:02:13	0:03:24	0:04:37	0:05:47	0:07:02	0:09:33	0:10:08
0:15:00	0:10:00	0:02:15	0:03:26	0:04:40	0:05:51	0:07:08	0:09:40	0:10:15
0:15:10	0:10:07	0:02:17	0:03:29	0:04:43	0:05:55	0:07:12	0:09:47	0:10:22
0:15:20	0:10:13	0:02:18	0:03:31	0:04:47	0:05:59	0:07:17	0:09:53	0:10:28
0:15:30	0:10:20	0:02:20	0:03:34	0:04:50	0:06:04	0:07:23	0:10:00	0:10:35
0:15:40	0:10:27	0:02:22	0:03:36	0:04:53	0:06:08	0:07:27	0:10:07	0:10:42
0:15:50	0:10:33	0:02:23	0:03:39	0:04:57	0:06:12	0:07:33	0:10:13	0:10:48
0:16:00	0:10:40	0:02:25	0:03:41	0:05:00	0:06:16	0:07:37	0:10:20	0:10:55

Comments about completing the Efforts listed as “Hard, Easy, Moderate, and Steady”
(With permission, as found in “TRAIN SMART, RUN FOREVER”)

The FIRST Exertion Scale is used to gauge the intensity of exercise. The numbers are tied to descriptions of the effort that an activity requires.

EASY (the recovery after the “Hard” efforts):

- 2 Relaxed effort with a slightly increase in heart rate
- 3 A steady aerobic effort with breathing normal

For **STEADY** (for the 26 and 30 minute runs)

- 4 Aware of effort, but not experiencing any difficulties
- 5 Not laboring, but having to stay focused to maintain effort
- 6 Having to coax yourself to maintain intensity

For **HARD** (for the 2, 3 and 5 minute efforts)

- 7 Comfortably hard; audible breathing; conversation has ceased
- 8 Heavy breathing; really hard effort
- 9 Very heavy breathing; can only sustain for a couple of minutes

Comments about completing the High Intensity Training

Once you have completed the **High Intensity Training** program, interested candidates can repeat a 1.5 mile run for time to establish new target training times and paces and then repeat the training program.

***** Start this training cycle with a new pair of running shoes. Studies show there is twice the chance of getting lower extremity stress fractures with shoes that are older than 6 months.*****

Comments about the Cross-Training Workouts

The primary purposes of the cross-training sessions are to help keep overall aerobic fitness high while allowing the running muscles to recover from the stress of high intensity running. The cross training workouts should be completed at a moderate-to-hard effort level. You can use “perceived effort” as a reference for cross-training effort level or intensity. “Moderate” effort certainly indicates increased sweating and respiration, and at this effort level conversation will be possible but not easy. “Hard” effort will be marked by considerably higher exertion and an inability to hold a conversation due to much heavier breathing.

It is important to choose activities that complement your running. The intention is to give the running muscles a break. Activities such as rowing, cycling and swimming provide good cardiovascular benefits without stressing your running musculature. These are non-weight bearing activities that give the legs and running muscles a well-deserved break, promoting recovery.

Comments about the Strength Training

Plebe Summer will be a physically demanding experience. In addition to overall performance enhancement, strength training improves running economy (one of the key determinants of running performance), permitting faster running over the same distance. Improved running economy means you can run for a longer time before exhaustion sets in. When you become fatigued, your form deteriorates (poor running economy). The deterioration comes not only from tired legs, but also from tired arms, a tired back and tired abdominal muscles.

This training program suggests performing three strength training workouts per week (as indicated in the following table). It is further recommended that any lower-body strength training be completed on the same day as the Key Run Workouts (*but after your run workout*) in order to allow for adequate recovery.

Table 5. MINIMUM RECOMMENDED “STRENGTH” ROUTINE

Week	Tuesday	Thursday	Saturday
1	2 sets of the following four exercises: 30 sec max PU; 30 sec FP, 30 sec SP (no rest b/w sets)	PU and FP Ladder #1	PU 5x10 (30 secs rest interval (RI) between each set) Planks 2x30 secs (30 sec RI); 2x15 secs (15 sec RI)
2	PU and FP Ladder #1 Bird Dogs (BD) 1x20	PU 5x15 (45 sec RI) SP 3x15 sec (15 sec RI) FP 3x30 sec (30 sec RI)	45 sec cadence PU (2 min RI) 2 x 45 sec FP (45 sec RI)
3	Cadence PU 1x45 sec (45 sec RI), 1x30 sec (30 sec RI) FP Ladder #2	PU 5x20 (90 sec RI) FP 3x30 sec (30 sec RI) BD 2x20 (45 sec RI)	PU and FP Ladder #2
4	PU 5x20 (70 sec RI) FP Ladder #2	PU and SP Ladder #2	PU 5x20 (70 sec RI) BD 2x20 (45 sec RI) Pull-ups 2x max reps plus 2 sets of negatives (70 sec RI)
5	3 sets of the following four exercises: 30 sec max perfect PU; 30 sec FP, 30 sec SP (each side) (no rest)	PU and FP Ladder #3	PU 5x25 (90 sec RI) FP 3x30 sec (20 sec RI) BD 4x15 (30 sec RI) Pull-ups 3x max reps (1 min RI)
6	PU and FP Ladder #3 BD 4x15 (30 sec RI)	PU 4x25 (70 sec RI) FP 3x30 sec (20 sec RI) SP 2x20 sec (30 sec RI) Pull-ups 3x max reps (1 min RI)	3 sets: max PU, FP 1 min, & pull-ups 1 min rest between sets
7	PU 5x25 (80 sec RI) FP 4x30 sec (30 sec RI) SP 2x30 sec (30 sec RI) Pull-ups 3x max reps (1 min RI)	PU and FP Ladder #3 BD 4x15 (30 sec RI)	3 sets: max PU, FP 1 min, & pull-ups 1 min rest between sets
8	Cadence PU 2x45 sec (1 min RI), FP Ladder #3	PU and FP Ladder #2 BD 4x15 (30 sec RI)	PU 5x25 (80 sec RI) FP 4x30 sec (30 sec RI) SP 2x30 sec (30 sec RI) Pull-ups 3x max reps (1 min RI)

9	3 sets: max PU, FP 1 min, & pull-ups 1 min rest between sets	PU and FP Ladder #3 3 min RI, and then: PU and FP Ladder #1	PU and FP Ladder #2 BD 4x15 (30 sec RI) Pull-ups 3x max reps (1 min RI)
10	PU and FP Ladder #3 BD 4x20 (30 sec RI)	PU 4x30 (70 sec RI) FP 3x45 sec (30 sec RI) SP 2x45 sec (45 sec RI) Pull-ups 3x max reps (1 min RI)	3 sets: max PU, FP 1 min, & pull-ups 45 sec rest between sets
11	PU 5x25 (70 sec RI) FP 4x35 sec (30 sec RI) SP 2x45 sec (45 sec RI) Pull-ups 3x max reps (1 min RI)	PU and FP Ladder #3 BD 4x15 (30 sec RI)	Cadence PU 2x45 sec (45 sec RI), FP Ladder #3
12	4 sets of the following four exercises: 30 sec max perfect PU; 45 sec FP, 45 sec SP (each side) (no rest)	PU and FP Ladder #2 BD 4x20 (30 sec RI)	PU 5x30 (90 sec RI) FP 4x45 sec (30 sec RI) SP 2x45 sec (45 sec RI) Pull-ups 3x max reps (1 min RI)

Explanation of Table 5:

PU = Push-ups (Cadence is specified when applicable. Otherwise, execute clean, proper form push-ups as recommended.)

FP = Front plank

SP = Side plank (Always work both sides of the body. Therefore, if the workout calls for 2 sets, you will conduct 4 sets total (2 on each side).)

BD = Bird Dogs (Always alternate: right leg and left hand extension, followed by left leg/right arm extension.)

RI = Rest interval

On days directed to do PU and FP ladders, use the guide below. If the workout calls for both PU and FP, you will drop into the FP position immediately after completing each PU set. The RI between sets is the same number of seconds as the FP was just held.

Table 6. Strength Ladders

PU and FP (or SP) Ladders (shown as number of push-ups to conduct (and number of seconds to hold front plank or side plank shown in parentheses)):

#1:	2(3)	4(5)	6(7)	8(9)	10(10)	8(9)	6(7)	4(5)	2(3)
#2:	3(4)	6(7)	9(10)	12(12)	15(15)	12(12)	9(10)	6(7)	3(4)
#3:	4(10)	8(10)	12(10)	15(10)	18(10)	15(10)	12(10)	8(10)	4(10)

Explanation of exercises:

- Push-ups (PU). See pictures below for proper form.



- Front Plank (FP). . Keeping your body straight, hold yourself off the ground while facing down with only your toes and elbows for the prescribed time. See picture below.



- Side Plank (SP). Keeping your body straight, hold yourself off the ground while facing horizontally with only one hand and the outside of the same-side foot for the prescribed time. See picture below. *An alternate version permits placement of the left elbow and forearm (or right) on the ground instead of the hand with the arm extended.



- Bird Dogs (BD). While on the ground on your hands and knees you will extend one arm in front of you and the opposite leg to the rear at the same time. One repetition is completed after one alternation (i.e. having extended both sides). See picture below.



Comments about the Cycling Workouts

Cycling helps develop the quadriceps which can balance out the strengthening of the hamstrings and calves that results from running. Cycling can also increase hip and knee joint flexibility. Because there is no pounding with cycling, runners often recover quickly; therefore, cycling does not interfere too much with the demands of the Key Run workouts. Performing intervals on a bike can also help increase leg turn-over for running while contributing to improved running speed. High-power bike intervals work the leg muscle even harder than uphill running, but without the impact of hard running.

For runners who cycle, cadence is important. Most runners who cycle tend to “push a big gear” with a low cadence when cycling. Instead, it is recommended you focus on maintaining a quick pedaling cadence of 90 to 100 pedal revolutions per minute (rpm).

30 Minute High Intensity Cross-Training Cycling Workouts (Examples)

Cycling Workout Idea #1

Begin with 5 minutes of easy cycling at cadence of 80+ rpm

2 x (5 minutes at a moderate effort with cadence of at least 90 rpm followed by 5 minutes easy with cadence of 95–100 rpm).

End with 5 minutes of relaxed cycling as a cool down.

Cycling Workout Idea #2

30 minute high intensity cross-training workout

Begin with 5 minutes of easy spinning at cadence of 80+ rpm.

2 x (10 minutes at 90+ rpm at a moderate effort followed by 3 minutes easy).

End with 5 minutes of cycling as a cool down.

Cycling Workout Idea #3

Begin with 5 minutes of easy cycling at cadence of 80+ rpm

4 x (1 minute fast at a hard effort, 1 minute easy).

1 x (4 minutes fast at a hard effort, 1 minute easy).

4 x (1 minute fast at a hard effort, 1 minute easy).

4 minutes of easy cycling as a cool down.

Cycling Workout Idea #4

Begin with 5 minutes of easy cycling at cadence of 80+ rpm

4 x (4 minutes at a moderate effort with cadence of at least 90 rpm with 1-minute recovery)

End with 5 minutes of relaxed cycling as a cool down.

Cycling Workout Idea #5

Begin with 4 minutes of easy cycling at cadence of 80+ rpm

6 x (1 minute moderate effort, 1 minute at hard effort, 1 minute very hard effort, 1 minute easy)

End with 2 minutes of relaxed cycling as a cool down.

Cycling Workout Idea #6

Begin with 5 minutes of easy cycling at cadence of 80+ rpm

3 x (3 minutes at a hard and fast effort; 1 minute at an easy effort)

8 minutes at a steady and moderately hard effort

End with 5 minutes of relaxed cycling as a cool down.

Cycling Workout Idea #7

Begin with 4 minutes of easy cycling at cadence of 80+ rpm

8 x (2 minutes at a hard and fast effort, 1 minute easy)

End with 2 minutes of relaxed cycling as a cool down.

Cycling Workout Idea #8

Begin with 4 minutes of easy cycling at cadence of 80+ rpm

12 minutes at moderate effort; 2 minutes at an easy effort; 8 minutes at a moderate effort

End with 4 minutes of relaxed cycling as a cool down.

Cycling Workout Idea #9

Begin with 5 minutes of easy cycling at cadence of 80+ rpm

1 x (4 minutes at a hard effort, 1 minute easy)

2 x (3 minutes at a hard effort, 1 minute easy)

3 x (2 minutes at a hard effort, 1 minute easy)

3 minutes of easy cycling as a cool down.

MINIMUM RECOMMENDED FLEXIBILITY ROUTINE

Before and after each workout you must properly warm-up and cool-down your body to help prevent injuries. Dynamic stretching should be a part of your warm-up always. Static stretching is best to complete after your workout, holding each stretch at the point of “mild discomfort” (but not pain).

Some good stretches to consider doing are:

- Eagles: On your back, take your right leg and try and touch your left hand, holding it for a count of ten. Then roll the other way and try and touch your left leg to your right hand holding for a ten count.



- Reverse Hurdlers Stretch: With right leg out and left leg bent at the knee and left foot touching right knee, bend forward reaching for right foot. Hold for 15 seconds. Switch legs and repeat.



- Hip Stretches: Cross right leg over left leg and pull right knee toward left shoulder with left arm stretching right hip. Hold 15 seconds. Switch legs and pull left knee toward right shoulder with right arm. Hold 15 seconds.



- Quadriceps Stretches: Start by lying on your left side, grab your right ankle with your right hand and pull back stretching the quad for 15 seconds. Change legs and repeat.



- Calf Stretches: One leg in front, one leg in back, begin with straight knee, stretching calf muscle. Slowly bend knee to stretch lower leg, hold for 15 seconds. Change legs, repeat.



- Elbow pulls: Bend arm overhead, (touch spine), push elbow back, stretching triceps muscle. Hold for 15 seconds. Switch arms, repeat.



- Arm Cross: Cross arm in front of body, trying to touch elbow to opposite shoulder. Hold for 15 seconds. Switch arms, repeat.



- Butterflies: With feet together, pulled in toward groin as far as possible, slowly press knees toward ground. Hold in down position for 15 seconds.



- Hamstring stretches: Spread legs in a “V”. Lean down toward left leg. Hold for 15 seconds. Back up. Move to middle, stretching as far forward as possible, hold for 15 seconds. Back up. Stretch toward right leg, hold for 15 seconds.



**Good luck with the training, have fun with it and challenge yourself to get better every day.*

We look forward to working with you.

Expect to Win!

Acknowledgement:

The running program associated with this training plan was written by Dr. Bill Pierce and Dr. Scott Murr, faculty in the Health Sciences Department at Furman University in Greenville, SC. Pierce and Murr are running experts at The Furman Institute of Running and Scientific Training (FIRST) and authors of the popular book *Runner's World Run Less, Run Faster* and *Runner's World Train Smart, Run Forever*.