

A STUDY OF PHYSICAL FITNESS OF 14-YEAR OLD
FRESHMEN BOYS OF PAOLA HIGH SCHOOL

by

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INTRODUCTION

Physical fitness is being stressed today by physical educators and other interested people. Much momentum has been given to the fitness movement by Presidents Eisenhower, Kennedy, and Johnson. The President's Council on Youth Fitness, under the administrations of the above named presidents, has given assistance through the development of physical education program aids which have emphasized physical fitness.¹

Government interest in physical fitness is not new, although the interest has varied throughout history. Military motives have been largely responsible for government interest in physical fitness. The Persian physical education program, including fitness, in the sixth century before Christ, for example, was the key to the astonishing success of the Persian conquests of that century.² The ancient Chinese, on the other hand, had little or no threat of foreign invasion and no ambition to conquer their neighbors. Their physical fitness program was limited to a series of medical exercises which was intended to ward off disease. There was no Chinese national sport, with the nearest thing to it being kite flying.³

¹President's Council on Youth Fitness, Youth Physical Fitness, Suggested Elements of a School-Centered Program, Parts One and Two (Washington: Government Printing Office, July, 1961) pp. 10-13.

²Emmett A. Rice and John L. Hutchinson, A Brief History of Physical Education, (New York: A. S. Barnes and Company, 1952) pp. 10-13.

³Ibid., pp. 7-9.

In the United States, during the twentieth century, a war time environment has given impetus to the physical fitness movement. Selective service reports, for example, during both World War II and the Korean Conflict revealed that approximately one of every three men examined was unfit for military service.⁴ Those reports, although somewhat misleading, caused many Americans to ask for more vigorous physical education programs in the nation's schools.

Reasons, not associated with military objectives, have, also, caused leaders in America to promote physical fitness. As early as 1818, Captain Alden Partridge, an early superintendent of the United States Military Academy, resigned from the military service in order to be free to promote a reform among institutions of higher learning in America. He proclaimed that "many of the most promising youth are losing their health by the time they are prepared to enter on the grand theater of life" for want of an adequate physical fitness program.⁵

More recently, many physical educators and other interested people have called for a level of physical fitness which would allow the individual to handle the normal tasks of his existence without excessive fatigue and with a little strength and endurance remaining for emergencies.⁶

⁴Florence L. Meredith, Leslie W. Irwin, and Wesley M. Staton, Health and Fitness, (Boston: D. C. Heath and Company, 1962) p. 3.

⁵Rice and Hutchinson, op. cit., p. 151.

⁶H. Harrison Clarke, Application of Measurement to Health and Physical Education, (Englewood Cliffs: Prentice-Hall, Inc., 1959) p. 55.

During the twentieth century, the physical fitness needs of the gifted students have, generally, been taken care of through interscholastic athletics. In many cases, however, the needs of the physically underdeveloped students have been overlooked.⁷ It should be pointed out that genuine physical fitness has best been determined through the use of medical examinations and physical fitness tests.⁸ It has been shown that through the use of medical examinations and effective physical education programs, which stress physical fitness, that individuals can develop levels of physical fitness commensurate with their own personal needs and abilities.

PURPOSE OF TESTING FOR PHYSICAL FITNESS

One purpose of testing for physical fitness at Paola High School has been to help in the identification of the needs of the students in physical education. By identifying the needs of these students, particularly those who are considerably underdeveloped, better preparation can be made to meet their needs.

A second purpose in testing physical education students for physical fitness is that in testing for strength, agility, and endurance, a grand opportunity for student self-evaluation is presented. Through participating in tests with established national norms, the student has a broader base with which to compare his own physical capabilities. When no tests and norms are available, the

⁷President's Council on Youth Fitness, op. cit., p. 4.

⁸Meredith, Irwin, and Staton, loc. cit.

student can make only an empirical evaluation, comparing himself to his classmates and other acquaintances.

PURPOSE OF THE PROBLEM

The purposes of this problem were three: (1) to compare the level of physical fitness of the 14-year old freshmen boys of Paola High School to the national physical fitness norms, which have been established by the President's Council on Youth Fitness, (2) to detect weaknesses in the general physical education program of Paola High School, (3) to help in the collection of data which will be used in the establishment of physical fitness norms for the state of Kansas.

DEFINITION OF TERMS

The following terms have been used in this problem and should be defined to avoid misunderstanding:

1. Unsatisfactory--used to represent, in this problem, the scores which fell below the minimum requirement of the "poor" category which was established by the President's Council for Youth Fitness.
2. Mean-----the average, the sum of the scores divided by their number.¹
3. Picker-----an individual used in the identification of runners with their proper times during the 600-yard run--walk event which has been used in this report.

¹Clarke, op. cit., p. 428.

ADMINISTRATION OF THE TESTS

The physical fitness tests used in the physical education classes of Paola High School have been administered according to the instructions prepared by the President's Council for Youth Fitness which were published in Youth Physical Fitness in July, 1961.

The fall test was administered during the second week in September, 1963, and the spring test was administered during the third week in May, 1964.

Members of the Freshmen and Sophomore physical education classes participated in the physical fitness tests. The results of tests administered to freshmen boys who were 14 years of age for a part of the school year were used in this problem.

During the school year, all of the 60 freshmen boys of Paola High School were tested one or more times. Of that number, 3 students were not 14 years of age at any time during the year; therefore, the results from their tests were not included in this report. Three additional students had injuries which prohibited them from taking the spring test. Two of the freshmen boys became school "drop-outs" and were not enrolled in school at the time of the spring test. As a result of residential movement, 6 of the freshmen students were not enrolled at the time of one of the tests. Seven freshmen students were not available at the time that all or part of one test was being administered because of school absences or other reasons. The results of the tests administered to the remaining 39 14-year old freshmen boys of Paola High School were used in this study.

NORMS USED IN THIS PROBLEM

The physical fitness norms used in this problem have been determined through the use of pilot studies by the President's Council on Youth Fitness. The standards of performance for the test items used have been validated.¹

The President's Council for Youth Fitness has established minimum requirements for achievement categories titled "Excellent", "Good", "Satisfactory", and "Poor". In this problem the results which were below all those categories have been referred to as "UNSATISFACTORY". Those categories and the requirements for ranking in them are shown in TABLE I.

TESTS AND RESULTS

The following seven events have been used in the physical fitness tests which have been administered to the physical education students of Paola High School: (1) pullups, (2) sit ups, (3) shuttle run, (4) standing broad jump, (5) 50-yard dash, (6) softball throw for distance, and (7) 600-yard run--walk.

The methods of administering the tests during each event and the results of each event are shown below.

I. PULL UPS

The pullups were done on a normal horizontal bar which was

¹President's Council for Youth Fitness, op. cit., p. 9.

TABLE I.
 SAMPLE PHYSICAL FITNESS TESTING SCORE SHEET²
 (For BOYS 14 Years of Age)

Pupil _____ School _____ Teacher _____

1st test-Circle scores in RED. 2nd test-Circle scores in GREEN.
 3rd test-Circle scores in BLUE. Connect circled scores after each
 test to show physical fitness profile.

	Sit Ups	Pull Ups	Broad Jump	50- Yard Dash	Shuttle Run	Soft- ball Throw	600 Yards
EXCELLENT	99	10	7'2"	6.5	9.4	190'	1:52
	96		7'1"	6.6		187'	
	93				9.5	184'	1:54
	90	9	7'				
	87			6.7	9.6	181'	1:56
	84		6'11"				
	81	8			9.7	178'	1:58
GOOD	78		6'10"	6.8		175'	
	75				9.8		2:0
	72	7	6'9"			172'	
	69			6.9	9.9	169'	2:2
	66		6'8"				
	63	6			10.0	166'	2:4
	60		6'7"	7.		163'	
	58				10.1	161'	2:6
	56	5	6'6"	7.1		159'	2:8
	54		6'5"		10.2	157'	2:10
SATISFACTORY	52		6'4"	7.2		155'	2:11
	50	4	6'3"		10.3	153'	2:12
	48		6'2"	7.3	10.4	151'	2:14
	46		6'1"			149'	2:16
	44				10.5	147'	2:18
	43		6'				2:20
	42			7.4		145'	
	41	3	5'11"		10.6		2:22
	40			7.5	10.7	143'	
	39		5'10"			141'	2:24
POOR	38						
	37		5'9"		10.8	139'	
	36	2		7.6			2:26
	35		5'8"		10.9	137'	
	34					135'	2:28
	33		5'7"	7.7	11.0	133'	2:30
UNSATISFACTORY							

²President's Council for Youth Fitness, op. cit., pp. 44-55.

raised to a height higher than any student in the group could reach from the floor. A chair was provided, when needed, to help the shorter students to reach the bar. The chair was removed when the participant had grasped the bar. The bar was grasped with the palms facing away from the chest. The body was allowed to, momentarily, hang with the arms and legs fully extended. A partner stood in front and slightly to one side to count the pullups and to check the procedure used by the student being tested. The body was pulled, gradually, upward by the arms until the chin could be placed over the bar. It was then lowered until the arms were fully extended. This action was repeated as many times as possible by each student. All forms of kicking and swinging were disallowed. One pullup was counted each time the student, legally, placed his chin over the bar. In several cases, pullups were not counted when students failed to fully extend their arms.

The mean number of pull ups done by the Paola 14-year old freshmen boys during, both, the fall and spring tests was 3.8 pull-ups. The group ranked in the "poor" category being .2 pull ups below the "satisfactory" category minimum. The maximum number of pull ups done by any individual during the fall test was 13 while the maximum number done in the spring was 12. This was accomplished by a different student in each test. The student who was able to do 13 pull ups in the fall accomplished only 10 in the spring while the individual who did 12 in the spring had improved by 2 pull ups, having done 10 in the fall test. Five students could do no pull ups in the fall and four students could do none in the spring. Two

boys improved from 0 pull ups to 1 pull up and one boy who had accomplished 1 pull up in the fall did none in the spring. The same boys who ranked "excellent" in the fall test, also ranked "excellent" in the spring test. There was, however, much change and movement throughout the other categories.

The results of the pull ups are shown in TABLE II.

TABLE II. PULL UP RESULTS

	FALL		SPRING	
	No.	%	No.	%
EXCELLENT	2	5	2	5.1
GOOD	7	18	7	18.0
SATISFACTORY	12	31	10	25.6
POOR	9	23	12	30.8
UNSATISFACTORY	9	23	8	20.5
TOTAL	39	100	39	100.0

II. SIT UPS

In testing the Paola students on sit ups, the boys worked in pairs with one-half of the number doing the sit ups while partners counted, watched the procedure being used, and held the heels of the boys being tested.

The starting position for this test was to lay on the floor with the legs extended and the feet approximately one foot apart. The hands were placed behind the head with the fingers interlaced. The sit ups were done by sitting up and turning the trunk to the

left and touching the left knee with the right elbow. The students then returned to the starting position, sat up again, turned the trunk to the right, touched the right knee with left elbow, and returned to the starting position. One sit up was counted each time the students returned to the starting position, providing proper procedure had been used.

The students were told to do as many sit ups as possible, except that they should not exceed the number shown in the "excellent" category for their age. The requirement for ranking "excellent" at age 14 is ninety-nine sit ups.

The Paola 14-year old freshmen boys did a mean number of 41.1 sit ups in the fall and 73.2 sit ups in the spring. The group ranked in the "poor" category in the fall, being 2.9 sit ups below the "satisfactory" category minimum and ranked in the "good" category in the spring. The maximum number of sit ups done by any individual in the fall test was 94 while eight students stopped during the spring test, after completing 99 sit ups which ranked them in the "excellent" category. Of those eight students, one had ranked "good", four had ranked "satisfactory", two had ranked "poor", and one had ranked "unsatisfactory" in the fall test. The fewest number accomplished in the fall was 14 while the fewest completed in the spring was 23. The student who did only 14 sit ups in the fall did 99 in the spring, which ranked him in the "excellent" category. The student who did only 23 sit ups in the spring had completed 39 in the fall test. The sit up results from the fall and spring tests are shown in TABLE III.

TABLE III. SIT UP RESULTS

	FALL		SPRING	
	No.	%	No.	%
EXCELLENT	0	0.0	8	20.5
GOOD	1	2.7	12	30.8
SATISFACTORY	23	58.7	10	25.6
POOR	8	20.6	7	18.0
UNSATISFACTORY	7	18.0	2	5.1
TOTAL	39	100.0	39	100.0

III. SHUTTLE RUN

The students were tested in a shuttle run by marking two lines on a gym floor 10 yards apart. Two normal blackboard erasers were placed on one line and the students starting from behind the opposite line. The starting position was standing, ready to run, behind the line. On a signal of "Ready--Go" a student ran to the erasers, picked one up and carried it to the starting line where he laid it behind the line. He, then, ran to the second eraser, picked it up, and carried it as quickly as possible across the starting line. The action was timed from the signal "Go" until the student carried the second eraser across the line. Two trials were allowed and the best time was recorded to the nearest .1 of a second. Trials were disallowed when the student being tested dropped or tossed the eraser behind the starting line.

The mean time of the Paola 14-year old freshmen boys was 10.65

seconds in the fall and 10.48 seconds in the spring. The group was classified as "poor" in the fall and as "satisfactory" in the spring. The best time recorded by any student was 8.9 seconds, which was accomplished by the same student during, both, the fall and spring tests. The poorest time recorded in the fall test was 13.2 seconds. The boy who was responsible for that time improved his time to 12.5 seconds in the spring test. The slowest time run in the spring test was 14.6 seconds and was run by a student who had recorded a time of 12.7 seconds in the fall test. The results of the fall and spring tests of the shuttle run are shown in TABLE IV.

TABLE IV. SHUTTLE RUN RESULTS

	FALL		SPRING	
	No.	%	No.	%
EXCELLENT	2	5	5	12.8
GOOD	9	23	9	23.1
SATISFACTORY	9	23	12	30.8
POOR	11	28	5	12.8
UNSATISFACTORY	8	21	8	20.5
TOTAL	39	100	39	100.0

IV. STANDING BROAD JUMP

In order to test the Paola students in the standing broad jump, a starting line was marked on the gym floor with the area in front of that line measured and marked to the nearest inch. A

student stood behind the line and jumped as far as possible. The jump was measured from the starting line to the nearest point hit by a part of the jumper's anatomy. Three trials were allowed and the best jump was recorded to the nearest inch. In a few cases, jumps were disallowed because students stepped forward onto the starting line before jumping.

The Paola 14-year old freshmen boys were classified in the "poor" category in the fall and the spring tests. The mean jump in the fall was 5' 7.18" while the mean jump in the spring was 5' 11.51". The best jump during the fall test was 6' 10". The same boy recorded the best jump in the spring by jumping 8' 2". The shortest jumps recorded in the fall and spring tests were 3' 6" and 4' 1", respectively, by the same student. The results of the standing broad jump event are shown, for the fall and spring tests, in TABLE V.

TABLE V. STANDING BROAD JUMP RESULTS

	FALL		SPRING	
	No.	%	No.	%
EXCELLENT	0	0	2	5
GOOD	4	10	7	18
SATISFACTORY	10	26	9	23
POOR	7	18	8	21
UNSATISFACTORY	18	46	13	33
TOTAL	39	100	39	100

V. FIFTY-YARD DASH

Because no satisfactory outside running area was available near the school building, the fifty-yard dash was run on the sidewalk outside of the school building by the Paola group. The students started in pairs from behind a starting line. The starter was at the starting line and two timers were at the finish line. The starter raised his hand on the signal "ready" and started it downward quickly as he said "go". The watches were started by the timers as the starter's hand began its downward movement and were stopped as the runner which was assigned to that particular watch and timer crossed the finish line. One trial was allowed and the time was recorded to the nearest .1 of a second.

The Paola 14-year old freshmen boys scored a mean time of 7.76 seconds in the fall and 7.33 seconds in the spring. The mean placed that group in the "unsatisfactory" category in the fall being .06 seconds below the "poor" category minimum. In the spring, the group mean placed the Paolans in the "poor" category being .03 seconds below the "satisfactory" category minimum. The best time for any student in the fall test was 6.6 seconds; however the same boy ran the 50 yards in 7.0 seconds in the spring. The best time run in the spring test was 6.4 seconds by a boy who had run the 50 yards in 6.9 seconds in the fall. The boy who ran the slowest times in both the tests improved his time from 11.1 seconds in the fall to 10.1 seconds in the spring. Twenty-one students recorded "unsatisfactory" times in the fall while 8 boys ranked in the "unsatisfactory" category in the spring. The fall and spring results

of the 50 yard dash are shown in TABLE VI.

TABLE VI. FIFTY-YARD DASH RESULTS

	FALL		SPRING	
	No.	%	No.	%
EXCELLENT	0	0.0	3	7.7
GOOD	6	15.4	12	30.8
SATISFACTORY	6	15.4	10	25.6
POOR	6	15.4	6	15.4
UNSATISFACTORY	21	53.8	8	20.5
TOTAL	39	100.0	39	100.0

VI. SOFTBALL THROW FOR DISTANCE

The softball was thrown for distance by having the student standing, ready to throw, a few feet behind a restraining line. The student moved forward, throwing the ball with an overhand motion while behind the restraining line. The point where the ball hit was marked. Three trials were allowed and the best throw was measured and recorded to the nearest foot.

In the fall, the mean throw for the Paola 14-year old freshmen boys was 136' 6". The same group had a mean throw of 157' in the spring test. The group ranked in the "poor" category in the fall and the "satisfactory" category in the spring. The best throws were 201' in the fall and 217' in the spring by the same boy. The shortest throw in the fall test was 66' by a boy who

improved his throw to 90' in the spring test. In the spring the shortest throw was 88' and was accomplished by a student who had thrown 75' in the fall test. In the spring, the number of people ranking in the highest three categories had increased since the fall test while the number of students in the lower two categories had been reduced. The results of the softball throw for distance for the fall and spring physical fitness tests are shown in TABLE VII.

TABLE VII. SOFTBALL THROW RESULTS

	FALL		SPRING	
	No.	%	No.	%
EXCELLENT	1	2.6	5	13
GOOD	10	25.6	13	33
SATISFACTORY	5	12.8	7	18
POOR	9	23.1	5	13
UNSATISFACTORY	14	35.9	9	23
TOTAL	39	100.0	39	100

VII. SIX HUNDRED YARD RUN--WALK

Because no satisfactory outside running area was available near the school building, the 600-yard run--walk was run on the sidewalk outside the school building. The students started in a standing position behind the starting line. On the signal "Ready" the students prepared themselves to start running. On the signal "Go" the students started running and the stopwatch was started.

Four students ran at one time and they were permitted to walk only when it was necessary. The runners' times were read as they crossed the finish line. "Pickers" designated to pick first, second, third, and fourth places, respectively, to the runners' times and names to the recorder who recorded the time in minutes and seconds.

The Paola 14-year old freshmen boys ranked in the "satisfactory" category in the fall and the "good" category in the spring. The mean time of the group was 2 minutes 10.5 seconds in the fall and 2 minutes .5 seconds in the spring. The best individual time in the fall was 1 minute 38 seconds. The same student ran the 600 yards in 1 minute 36 seconds during the spring test to tie for the fastest individual time in the spring. The second student who ran the 600 yards in 1 minute 36 seconds had recorded a time of 1 minute 46 seconds in the fall. The slowest student in the 600 yard run improved his time from 3 minutes 9 seconds in the fall to 2 minutes in the spring. The results of the 600-yard run--walk are shown in TABLE VIII.

TABLE VIII. 600-YARD RUN RESULTS

	FALL		SPRING	
	No.	%	No.	%
EXCELLENT	4	10	10	26
GOOD	16	41	19	48
SATISFACTORY	7	18	5	13
POOR	7	18	3	8
UNSATISFACTORY	5	13	2	5
TOTAL	39	100	39	100

SUMMARY

The results of the fall test showed that the Paola High School 14-year old freshmen boys ranked in the "poor" category or lower in six of the seven events in which they were tested. The only event in which the group ranked in the "satisfactory" category was the 600-yard run--walk which was run on the sidewalk outside the school house. The only event in which the group ranked in the "unsatisfactory" category was the 50-yard dash which was, also, run on the sidewalk outside the high school building. In the fall, the group mean was just below the "satisfactory" category minimum in pull ups and sit ups and just below the "poor" category requirement in the 50-yard dash.

The results of the spring test revealed that the Paola 14-year old freshmen boys had improved in all events, except pull ups, in which it had remained the same. The group ranked the "good" category in sit ups and the 600-yard run--walk, the "satisfactory" category in the softball throw for distance and the shuttle run, and the "poor" category in pull ups, the broad jump, and the 50-yard run. The group mean in pull ups ranked just below the minimum for ranking the "satisfactory" category. The complete summary of results for the fall and spring tests is shown in TABLE IX.

TABLE IX. SUMMARY OF THE FALL AND SPRING TESTS

	MEANS	
	FALL	SPRING
PULL UPS	3.8	3.8
SIT UPS	41.1	73.2
SHUTTLE RUN	10.65 seconds	10.48 seconds
BROAD JUMP	5'7.18"	5'11.51"
50-YARDS	7.76 seconds	7.33 seconds
BALL THROW	136'6"	157'
600-YARDS	2 minutes 10.5 seconds	2 minutes 0.5 seconds

CONCLUSIONS

It was concluded that the Paola 14-year old freshmen boys have ranked low when compared to the national norms which were established by the President's Council for Youth Fitness. It has been assumed that, although improvement was shown in all events, except pull ups, emphasis needs to be placed on raising the level of physical fitness of that group to a higher plane. It appears that particular emphasis needs to be placed on the development of muscles which are used in pull ups since no improvement was shown in that event.

It has been assumed that the lack of an adequate outside physical education classroom area has restricted the development of the student's capacity to favorably compare with the national norms. Since none has been available, it appears that the addition of chinning bars and climbing ropes to the gymnasium equipment of Paola High School would be advisable to help in the development of the muscles used in performing pull ups.

The results of this report will be made available to the state consultant of physical education to be used in the establishment of norms for the state of Kansas.

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Physical fitness is being emphasized, today, by physical educators and other interested people. Presidents Eisenhower, Kennedy, and Johnson have given impetus to the physical fitness movement in America. Physical fitness has been promoted by government officials throughout history, usually, for military reasons. Fitness is being stressed, however, for the purpose of helping individuals to handle their normal tasks, efficiently, without excessive fatigue, with a little strength and endurance remaining for possible emergencies.

Testing has been done in the physical education classes of Paola High School to help in the identification of the physical fitness needs of the students, particularly, those who are considerably under developed. Additional purposes in testing for physical fitness in those classes are providing opportunities for student-self-evaluation and motivation for developing higher levels of fitness.

This problem has been studied in order to assist in accomplishing the following tasks: (1) comparing the level of physical fitness of the 14-year old freshmen boys of Paola High School to the national norms, which were established by the President's Council for Youth Fitness, (2) detection of possible weaknesses in the general physical education program of Paola High School, and (3) the collection of data to be used in the establishment of physical fitness norms for the state of Kansas.

The physical fitness tests which have been used in the physical education program of Paola High School have been administered

according to the instructions prepared by the President's Council for Youth Fitness. Two tests were administered during the 1963-64 school year.

The events used in the physical fitness tests administered to the physical education classes of Paola High School were: (1) pull ups, (2) sit ups, (3) shuttle run, (4) standing broad jump, (5) 50-yard dash, (6) softball throw for distance, and (7) 600-yard run--walk. The norms used for comparison were established by the President's Council for Youth Fitness.

The fall physical fitness revealed that the Paola 14-year old freshmen boys ranked low in comparison to the national norms. The group ranked "satisfactory" in only one event while ranking "poor" or "unsatisfactory" in the other six events. The spring test showed that the group had improved in all the events tested, with the exception of pull ups, where no change was shown. The spring test, also, revealed that the group ranked in the "good" category two events, in the "satisfactory" category in two events and the "poor" category in three events.

Additional improvement appears to be needed in most of the seven events tested, but especially it is needed in pull ups. It appears, also, that additional equipment should be obtained by the physical education department of Paola High School and that additional emphasis should be placed upon activities which would tend to help Paola students develop the strength and endurance necessary to compare more favorably with the national norms.

The results of this study will be made available to the physi-

cal education consultant of the department of education of the
state of Kansas.