

A COMPARATIVE STUDY OF THE PHYSICAL
FITNESS OF FRESHMEN BOYS AT LYONS HIGH SCHOOL
WITH THE NATIONAL YOUTH FITNESS TEST

by

Larry Lawrence Frisbie

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PART I

INTRODUCTION

As educators, we are all concerned with each individual's physical, mental, social and moral well being. We know these areas cannot be easily divided, and their development must be kept to some degree in proper relationship to one another in order to cultivate a "well rounded" person. The problems which accompany these areas of development are a continual task for school administrators, and each area must be carefully evaluated to determine the knowledge, experiences, and discipline that will achieve the end result of our educational process.

One region of primary importance is the physical aspect of the individual. If the physical fitness of the person is neglected and all other areas are developed, the person's contributions to society can be greatly handicapped or may even be lost. The mind cannot perform at its peak capacity unless the body cooperates.¹

History of Physical Fitness. Historically and traditionally physical fitness has always been a concern of education. History points out that 500 years before Christ, fitness was considered a way of life. During the Golden Age

¹R.M. Marshall, "Toughening Our Soft Generation", The Saturday Evening Post, 235:13-17, June 23, 1962.

of Greece, Socrates demanded that each new born baby boy be inspected by a council to determine his fitness and decide whether he should be permitted to live or be put to death.²

The early Romans, too, placed great emphasis upon physical fitness. Their education programs included a compulsory and rigid physical training schedule geared to meet the demands of their society.³

In our own American society we have seen the impact of physical fitness accentuated by the survival of the early pioneers and World Wars I, II, and the Korean Conflict. We have seen the pendulum of emphasis swing from the far right to the extreme left and back again in the area of physical fitness numerous times in the history of our country. Each war awakened a national concern for our physical well being only to be followed by a decline in the emphasis on fitness even though the rejection rate of draftees was vastly increasing each time the alarm for war readiness was sounded.⁴

A Cause for the Decline. The changes and adaptation of our labor devices from man power to machine and push-button power have created a gradual unsuspected decline in

²Henry A. Shenk, "Is Physical Fitness a School Responsibility?", University of Kansas Bulletin of Education, November, 1963, p. 15.

³Ibid.

⁴George Walton, "Uncle Sam's Rejects", The Saturday Evening Post, 235:10, December 8, 1962.

the general physical fitness of the American public. Mechanization and automation have greatly replaced the physical work once done by many men and have given them a more sedentary life of desk and paper work as well as more leisure time.

Comparisons of American school age children to European children of the same age have shown the Americans to be inferior to the Europeans in all-round physical fitness.⁵ We have become a country of devoted spectators of physical activities rather than a nation of active participators.

Present Day Fitness Programs. Following the Korean conflict of 1951, we found the first stress in the history of our country being placed on physical fitness during a peace time era. This emphasis directed the formulation of the President's Council on Youth Fitness in 1956 by Dwight D. Eisenhower, who was then the President of the United States. From studies made of the Kraus-Weber test results and other research findings, this council resolved a need for today's national concern about fitness and the establishment of a National Youth Fitness Test which could serve as a guide for national awareness of fitness needs for the youth of today.⁶

⁵William R. Campbell and Richard H. Pohndorf, "Physical Fitness of British and United States Children", Health and Fitness in the Modern World, 1961, pp. 8-15.

⁶AAHPER, Youth Fitness Test Manual, (Washington, D.C.: National Education Association, 1960), Foreward.

The President's Council on Youth Fitness with its beginning in the Eisenhower administration was continued by the late President, John F. Kennedy, while he served his time in the White House. As President Kennedy stated:

It is of great importance that we take immediate steps to ensure that every American child be given the opportunity to make and keep himself physically fit - fit to learn, fit to understand, to grow in grace and stature, to fully live.

During Eisenhower's administration, Mr. Charles B. (Bud) Wilkinson, head football coach of the University of Oklahoma, was appointed as special consultant of the Youth Fitness Program. Under his guidance, pilot school studies were made on performances of 8,500 boys and girls from grades 5-12 in numerous states. These tests were conducted in order to establish national norms for the fitness test so that comparisons of the fitness status of similar age and maturation levels could be made. The results of this study was the launching of the Youth Fitness Project in 1957 by the American Association for Health, Physical Education and Recreation.⁷

The Fitness Program gained popularity and became a problem of national concern while Mr. Wilkinson headed the program. Media such as radio, television, newspapers, and periodicals gave the facts to the people. The composing and

⁷Ibid.

recording of the Chicken Fat record by Meredith Wilson was one aid that helped to arouse the American public and to stimulate the needed interest. Following Mr. Wilkinson's resignation from the Council, President Lyndon B. Johnson appointed Stan Musial, popular and all time great baseball player for the St. Louis Cardinals, to lead our physical fitness program.

We have now advanced almost seven years since the start of the President's Youth Council on Physical Fitness. Progress has been slow at times, but the public shows signs of interest and concern. The complete success of the program will depend on the leadership of enthusiastic well-trained men in the areas of health, physical education, and recreation. Most Americans are concerned about their physical fitness, but they need guidance. Physical fitness and health should always be a concern of education in our society as is emphasized in the "Seven Cardinal Principles of Education".

PART II

PURPOSE

Purpose of Physical Fitness Testing. Valid tests of physical fitness are an important part of all good physical education programs. From these test results, standards can be developed to measure achievement and diagnose weaknesses

as well as provide a means for self evaluation and a strong motivation for development within the individual pupil.⁸

Physical fitness tests like any other test should be given with definite educational objectives in mind and should aid the teacher in developing a more effective physical education program.⁹ The tests may be used to classify the students into homogeneous groups which help the teaching and learning of each group. The learning environment many times is more satisfactory if the students participate in groups of the same sex, size, maturity, strength, speed, agility, and skill.

Purpose of the Problem. It is the intention of this report: (1) to determine how the freshmen boys at Lyons High School ranked in fitness with the National Youth Fitness Test in comparison to other similar age groups in the United States; (2) to analyze the improvement of fitness by the students of Lyons High School from fall to spring testing so as to determine adjustments and changes needed in the overall Lyons physical education program; and (3) to assist in completing a study of youth fitness in the Kansas area

⁸President's Council On Youth Fitness, Youth Physical Fitness, (Washington, D.C.: Government Printing Office, 1961), pp. 8-9.

⁹Edward F. Voltmer and Arthur A. Esslinger, The Organization and Administration of Physical Education, (New York: Appleton-Century-Crofts, Inc., 1949), p. 396.

by the Department of Physical Education at Kansas State University by providing them and the State Department of Education with the data of the fitness of the freshmen boys at Lyons High School.

PART III

DEFINITIONS OF TERMS USED

AAHPER. The American Association for Health, Physical Education, and Recreation, a department of the National Education Association of the United States.

Fitness. Overall well being which has moral, intellectual, social, and emotional components as well as physical ones.¹⁰

Physical Fitness. Mixture of the best possible bodily health plus the physical condition to perform everyday tasks effectively and to meet emergencies as they arise.¹¹

Muscular Endurance. Ability to continue muscular exertions of sub-maximal magnitude.¹²

¹⁰Fred V. Hein, "What Is Physical Fitness?", NEA Journal, 51:34, February, 1962.

¹¹Ibid.

¹²H. Harrison Clarke, Application of Measurement to Health and Physical Education, (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1959), p. 223.

Circulatory Endurance. Moderate contractions of large muscle groups for relatively long periods of time which require an adjustment of the circulatory-respiratory system to the activity.¹³

Muscular Strength. Maximum strength applied in a single muscular contraction.¹⁴

Muscular (explosive) Power. Ability to release maximum muscular force in the shortest period of time.¹⁵

Speed. Rapidity with which successive movements of the same kind can be performed.¹⁶

Agility. Speed in changing body positions or in changing body directions.¹⁷

Fatigue. Decrease in work capacity caused by work itself.¹⁸

¹³Ibid.

¹⁴Ibid.

¹⁵Ibid.

¹⁶Ibid.

¹⁷Ibid.

¹⁸Peter V. Karpovich, Physiology of Muscular Activity, (Philadelphia : W.B. Saunders Company, 1959), p. 235.

Mean. The sum of the scores divided by their number, commonly called average or a score which represents all scores.¹⁹

Range. Measure of variability showing the extreme scores of lowest and highest.²⁰

Percentile. Measurement of decile points in the distribution.²¹

PART IV

TEST ADMINISTRATION

Background. The Fitness Testing Program that was eventually adopted and was approved by the American Association of Health, Physical Education, and Recreation after the pilot studies were made was named the National Youth Fitness Test. This test was approved for grades 5-12.

The National Youth Fitness Test was given for this study to all freshmen boys who entered Lyons High School in Lyons, Kansas for a two year period of time during the school years of 1962-63 and 1963-64. The complete testing battery consists of seven test items which can be given

¹⁹Clarke, op. cit., p. 428.

²⁰Ibid. p. 434.

²¹Ibid. p. 431.

indoors or outdoors plus three aquatic tests. The aquatic test items have not been included in the study due to a lack of facilities available at Lyons High School. The test items include: pull-ups, sit-ups, standing broad jump, shuttle run, fifty yard dash, softball throw for distance, and the 600 yard run-walk event.

Items of testing were given outdoors, if weather permitted, to two classes a day until all pupils were tested. The suggested two days for the complete test could not be followed because of class size, lack of facilities, and only one instructor. Normal completion time was five days under these conditions.

The tests were given twice each school term. The fall testing was done during the second week of school, and the spring testing was completed during a latter week in the last month of the student's freshman year. At the time of fall testing for both groups, the boys age groupings were, seventy-nine 14 year olds, nine 15 year olds, and one 16 year old. The age groupings had changed by spring testing to forty-four 14 year olds, thirty-nine 15 year olds, and six 16 year olds. The physical fitness classifications were based on ages at the time of each testing so as to give as valid results as possible.

The entire testing program started with 96 students of which 89 completed both phases of the program first in

the fall followed by the same testing in the spring. Of the seven who failed to complete the test, three moved to other schools, three sustained bone fractures prohibiting them from participation, and one was a school drop-out.

Students were encouraged to do their very best at all times and to give an all out effort. The test was explained fully to them before it was given, and each test item was demonstrated completely by the instructor prior to testing. The boys, however, were not aware that a study was being made of their results.

Test Items. The testing items were given in the following order:

Pull-ups - A regular adjustable horizontal chinning bar was used so that the pupil could hang with both his arms and legs fully extended and his feet free of the floor. The grip was the overhand grasp (palms forward). From the hanging position the pupil raised his body by his arms until his chin could be placed over the bar. He then lowered his body to a full hang as in the starting position. This routine is repeated as many times as possible. The body was not allowed to swing during the exercise, and the movement was made to be a steady and continuous pull rather than a snap or jerking movement. These movements plus raising and kicking the legs were prevented and checked by a person holding an extended arm across the front of the

pupil's thighs and another holding an extended arm in back of his leg calves. No resting was permitted in either the up or down position.²²

Sit-ups - The equipment necessary for this test item was a mat. Pupils were paired to aid one another. Each pupil lay in a position on his back on the mat with his legs extended and feet spread to a comfortable position. The hands were placed on the back of the neck with the fingers interlocked and elbows outward. The partner gently held the ankles of the pupil down keeping the heels in contact with the mat at all times and counted the repetitions of sitting up.

From this flat back position, the pupil sat up turning the trunk of his body to the left and touching the right elbow to the left knee returning to the starting position. He then sat up again turning the trunk to the right and touching the left elbow to the right knee. This procedure was repeated alternating sides as many times as possible or until the pupil reached the maximum number given on the norm chart.²³

Standing Broad Jump - This test item was conducted indoors on a mat which had been premeasured and marked in

²²AAHPER, Youth Fitness Test Manual, (Washington, D.C.: National Education Association, 1960), p. 4.

²³Ibid. p. 7.

inches to aid in testing the event. Pupils were to stand with feet spread in a comfortable position and toes behind the take off line. Prior to the jump the pupil was allowed to swing his arms backward and forward and bend his knees in a rhythmic fashion. The jump was made by simultaneously extending the knees and swinging the arms forward and pushing off the mat with the balls of the feet and the toes. Each person was given three trials, and the best of the three was recorded. Measurement of the distance of the jump was made from the front edge of the take off line to the heel of the foot or part of the body landing nearest the take off line.²⁴

Shuttle Run - The equipment necessary for this test was two blocks of wood two inches X two inches X four inches and a stop watch. The contestant was allowed to wear tennis shoes or go barefooted. Two parallel lines were marked on the floor thirty feet apart. The two wooden blocks were placed just behind one of the lines and the pupil started from behind the other line. On the signal "Ready? Go!" he ran to the blocks, picked one up, ran back to the starting line and placed the block behind the line. He then ran back and picked up the second block which he carried back to and across the starting line. The pupils were timed to

²⁴Ibid. p. 9.

the nearest tenth of a second from the "Go" signal until they crossed the starting line with the second wood block. The pupils ran in pairs and two trials per pupil were allowed with the best time being recorded.²⁵

50 Yard Dash - This item was conducted on the football field from one goal line to the 50 yard marker. The pupils ran in pairs. From behind the starting line they were started by a gun, and each was timed from the gun signal until he crossed the 50 yard finish line. Two trials were also allowed in this event, and pupils were allowed to run barefooted if they desired.²⁶

Softball Throw For Distance - This test item which required total body coordination was done on the football field marked at five yard intervals. The pupil threw a regulation softball while remaining within two parallel lines, six feet apart and behind a restraining line. Three throws were allowed each pupil with the measurement being taken at the mark farthest from the restraining line on a perpendicular angle from the point the ball landed to the restraining line.²⁷

600 Yard Run-Walk - The last item of the test was given on a 440 yard oval track. The total time for covering

²⁵Ibid. p. 8.

²⁶Ibid. p. 10.

²⁷Ibid.

the distance by running and walking or running all the way was recorded in minutes and seconds. The pupils ran in groups of ten with each pupil's time being called out individually as he crossed the finish line. A partner was assigned to each runner to remember the runner's time.

From a standing start a starter's gun was sounded and the pupils tried to cover the 600 yards as rapidly as possible. Walking was permitted but discouraged. In almost all cases the pupils ran the entire distance without walking.

Some pupils were timed on a premarked course around the football field, but it was found that the times on the track were significantly better because of fewer turns and larger curves which didn't fatigue the leg muscles as readily.²⁸

Muscle Groups Affected. The test battery is heavily weighted in certain aspects of muscular fitness. This is shown by listing the items of the test battery and after each indicating the aspect of muscular area efficiency that the test is supposed to measure.

The pull-up is an exercise that taxes the strength and endurance of the forearm muscles, the arm depressor muscles, and the scapulae adductor muscles of the back.

²⁸Ibid. p. 11.

Sit-ups show strength and endurance of the trunk mainly the rectus abdominis and hip flexor muscles.

The standing broad jump shows the explosive leg and foot power of the extensor muscle groups. This item tests basically the following muscles: gluteus maximus, quadriceps femoris, hallucis longus, and digitorum longus.

The shuttle run tests primarily leg power of the hamstring muscle group and the quadriceps femoris muscles, some endurance, and agility.

The fifty yard dash tests ordinary leg power of the explosive nature for speed usage and to some degree endurance.

The softball throw for distance tests the power of the upper and lower arm muscles and wrist both flexors and extensors with total body coordination brought into play. The primary muscles involved are the pectoralis major, the biceps brachii, and triceps brachii.

The 600 yard walk-run indicates the endurance of the upper and lower leg muscles and the relationship of the cardio-respiratory systems under sustained working conditions.²⁹

Norms Used. The AAHPER held a fitness meeting in 1956 with a view of surveying the fitness of United States youth. In 1957, a committee of the Research Council acting

²⁹Ben H. Massey, "The AAHPER Fitness Test", Physical Education Newsletter, January 12, 1960.

for the National Association agreed upon a set of tests to be administered to a nation-wide sampling of boys and girls between the ages of ten and seventeen.³⁰

Test directions were prepared and administered during the school year of 1957-58 at various schools throughout the United States. School children tested included those from urban and rural, public and private boys' and girls' and co-education schools. Norms were then established according to age and sex from the results of these pilot school studies. The following tables show the norm scales for the excellent, good, satisfactory, and poor classifications of each test item of 14 and 15 year old boys.

³⁰William R. Campbell and Richard H. Pohndorf, "Physical Fitness of British and United States Children", Health and Fitness in the Modern World, 1961, pp. 8-10.

TABLE I

CHART OF NORMS ESTABLISHED FOR 14 YEAR OLD BOYS BY
THE PRESIDENT'S COUNCIL ON YOUTH FITNESS*

Full Ups	Sit Ups	Standing Broad Jump	Shuttle Run	50 Yd. Dash	Softball Throw	600 Yd. Run-Walk
Excellent						
10	99	7'2"	9.4secs	6.5secs	190'	1:50mins
Good						
9	98	7'1"	9.5	6.6	189'	1:51
	90	7'0"	9.6		185'	1:54
8	85	6'11"	9.7	6.7		1:56
	80	6'10"			180'	1:58
7	75	6'9"	9.8	6.8	175'	2:00
	70	6'8"			170'	2:02
	65		9.9	6.9	165'	2:04
6	60	6'7"	10.0	7.0	163'	2:05
Satisfactory						
5	59	6'6"	10.1	7.1	162'	2:06
	55	6'5"	10.2		160'	2:10
	50	6'4"	10.3	7.2	155'	2:12
		6'3"	10.4		150'	2:16
4	44	6'1"	10.5	7.3	147'	2:18
Poor						
3	43	6'0"	10.6	7.4	146'	2:19
	40	5'11"	10.7	7.5	145'	2:22
2	38	5'9"	10.8		140'	2:25
	36	5'8"	10.9	7.6	135'	2:28
1	33	5'7"	11.0	7.7	131'	2:30

*Youth Physical Fitness, *op. cit.*, pp. 44-54.

TABLE II

CHART OF NORMS ESTABLISHED FOR 15 YEAR OLD BOYS BY
THE PRESIDENT'S COUNCIL ON YOUTH FITNESS*

Pull Ups	Sit Ups	Standing Broad Jump	Shuttle Run	50 Yd. Dash	Softball Throw	600 Yd. Run-Walk
Excellent						
10	99	7'8"	9.3secs	6.2secs	207'	1:43mins
Good						
9	98	7'7"	9.4	6.3	206'	1:44
	90	7'6"	9.5	6.4	200'	1:46
	85	7'5"	9.6		195'	1:48
8	80	7'4"		6.5	190'	1:50
	75	7'3"	9.7			1:52
	70	7'2"	9.8	6.6	185'	1:54
	65	7'1"	9.9		180'	1:56
7	60	7'0"	10.0	6.7	182'	1:59
Satisfactory						
6	59	6'9"	10.1	6.8	181'	2:00
	58	6'8"			180'	2:02
	54	6'7"	10.2	6.9	175'	2:04
	50				170'	2:06
	46	6'6"	10.3		165'	2:08
5	45	6'5"	10.4	7.0	164'	2:09
Poor						
4	44	6'4"	10.5	7.1	163'	2:10
	42	6'3"	10.6		160'	2:14
3	40	6'2"	10.7	7.2	155'	2:16
	38	6'0"	10.8		152'	2:18
2	35	5'11"	10.9	7.3	150'	2:20

*Youth Physical Fitness, op. cit., pp. 44-54.

PART V

TESTS AND RESULTS

Pull-ups. The testing program of this event in the fall indicated very inferior results. Approximately 43 percent of the students tested were classified in the poor category and 31.5 percent of the students tested failed to complete one single pull-up. The class mean of 3.70 ranked at the 60th percentile on the national norm scale.

Results of the spring testing showed a mean score of 4.09. This was a gain of .39 pull-up per pupil or less than one-half of a pull-up. There was a slight improvement in the excellent classification from 4.49 percent to 5.61, and the good classification increased from 21.35 percent to 22.48. However, the percent in the satisfactory group dropped from 31.46 percent to 24.72 percent, and the poor group increased by almost four percent although only twelve students failed to do less than one pull-up this time. This indicates that several of the boys who ranked as satisfactory in the fall had actually decreased in ability to complete this skill during the year and could score no higher than a poor ranking the following spring.

TABLE III
RESULTS OF THE PULL-UP TEST

Classification	Fall		Spring		
	Number	Percent	Number	Percent	
Excellent	95%	4	4.49	5	5.61
Good	80%	19	21.35	20	22.48
Satisfactory	60%	28	31.46	22	24.72
Poor	40%	<u>38</u>	<u>42.70</u>	<u>42</u>	<u>47.19</u>
Total		89	100.00	89	100.00
		Range 0 - 15		Range 0 - 16	
		Mean 3.70		Mean 4.09	

Sit-ups. The results of this test item were the best of any of the test items. The findings were surprisingly high. During the fall test a majority of the class met the standards of the excellent percentile with 24.7 percent being in the poor category. The class mean was 72.87 sit-ups per person.

Spring testing in this item produced even better results. The number of students in the poor rank decreased from 22 to 10, and 56 of the students were in the excellent rank as compared to 45 in the fall. The class mean score for this event was 80.61 which is in excess of the 85 per-

centile on the national norms scale and showed an improvement of 7.74 sit-ups per individual. More personal competition was evident during the sit-up test than any other of the items mainly because this was one event most everyone could do well and with relative ease.

In discussing this particular test item with other colleagues, the author is dubious about the validity of the established norms for the sit-up test. It seems a majority of students tested were able to reach the 100th percentile, and the experience was that many students were able to far exceed the norm scale.

TABLE IV
RESULTS OF THE SIT-UP TEST

Classification	Fall		Spring		
	Number	Percent	Number	Percent	
Excellent	90%	45	50.56	56	62.92
Good	80%	11	12.36	8	8.99
Satisfactory	60%	11	12.36	15	16.85
Poor	40%	<u>22</u>	<u>24.72</u>	<u>10</u>	<u>11.24</u>
Total		89	100.00	89	100.00
		Range 6 - 100		Range 11-100	
		Mean 72.87		Mean 80.61	

Standing Broad Jump. This test which measured leg power showed 50.50 percent of the students as being poor. The class mean score of 5'9" was also a poor ranking. Fewer students were of excellent and good ability in this item for the fall testing than on any of the other tested items. Only five fell in the excellent rank and thirteen were of the caliber to rank good. These two classifications contained only 20.23 percent of the students tested.

Spring results in the standing broad jump were better with the mean score of 6'4" being an improvement of seven inches per student over the fall recording of 5'9". There was an increase of seven students in the excellent classification and thirteen in the good classification. Even with this improvement, 34.82 percent of the students tested were still in the poor rank. The class mean score improved from the 45th percentile rank to the 65th percentile rank. This was one event that practice greatly improved due to the necessity of rhythmic movements of the body parts of legs, arms, and hips.

TABLE V
RESULTS OF THE STANDING BROAD JUMP TEST

Classification		Fall		Spring	
		Number	Percent	Number	Percent
Excellent	95%	5	5.61	12	13.48
Good	80%	13	14.62	26	29.21
Satisfactory	60%	26	29.21	20	22.48
Poor	40%	<u>45</u>	<u>50.56</u>	<u>31</u>	<u>34.83</u>
Total		89	100.00	89	100.00
		Range 3'7"-7'3"		Range 4'-7'10"	
		Mean 5'9"		Mean 6'4"	

Shuttle Run. Fall test results in this item were the second lowest of all test items. Of the students tested, 76.41 percent ranked in the two lower classifications of satisfactory and poor. Only 21 of the 89 students tested were able to attain an excellent or good rating. The mean score of 10.72 was just slightly above average on the norm scale.

By spring test improvement was evident in all classifications. The poor rating was reduced by seven students, the satisfactory by thirteen, while the good gained fourteen students and the excellent was increased by six. Although the mean score changed from 10.72 to

10.45, this .27 of a second ranked the class average at the 60th percentile rank on the norm scale. It was interesting to note that the low range scores for fall testing was 13.4 compared to 15.5 for spring while the high range score improved 9.3 to 8.9 for the same testing periods. The poor low range score was the result of an extremely obese pupil who didn't respond to guidance or assistance. As a result he became even more overweight as the year progressed thus adding 2.1 seconds to his time for this event.

TABLE VI
RESULTS OF THE SHUTTLE RUN TEST

Classification	Fall		Spring			
	Number	Percent	Number	Percent		
Excellent	95%	4	4.49	10	11.24	
Good	80%	17	19.10	31	34.82	
Satisfactory	60%	31	34.83	18	20.22	
Poor	40%	<u>37</u>	<u>41.58</u>	<u>30</u>	<u>33.72</u>	
Total		89	100.00	89	100.00	
	Range	13.4-9.3 secs		Range	15.5-8.9 secs	
	Mean	10.72 secs		Mean	10.45 secs	

50 Yard Dash. These test results were of an abnormal nature. The tables show very little improvement from fall to spring. The lower areas of poor and satisfactory remained fairly constant with a change of two students being added to the poor area during the spring. In the excellent rank there was a loss of 5.62 percent from fall to spring while the good classification gained 3.36 percent during the same period of time. These results all amounted to a definite poorer showing by percentages in the spring than in the fall. Although there was a very slight improvement of .03 in the mean score of 7.31 in the fall to 7.28 in the spring there was a definite decline of 5 percentile points from 60 to 55 due to the age increase and decline of natural speed in the students.

Two factors influenced these results. One, both testings of the event in the spring were given on days of inclement weather conditions. These were periods of foul weather during the week of the testing program. Although the best day of the period was picked to complete this event, the cool and windy climatic conditions no doubt hindered the times to some degree. It is assumed that the weather could be an influencing factor in the performance of any or all events that are based on utilization of body and leg speed. Likewise, a slight degree of natural speed is lost by a majority of boys during periods of rapid growth and weight gaining especially during the freshman

year. This has been the experience of the author in eight years of coaching track and working with boys of this age group.

TABLE VII
RESULTS OF THE 50 YARD DASH TEST

Classification	Fall		Spring		
	Number	Percent	Number	Percent	
Excellent	95%	15	16.86	10	11.24
Good	80%	22	24.72	25	28.08
Satisfactory	60%	16	17.98	16	17.98
Poor	40%	<u>36</u>	<u>40.44</u>	<u>38</u>	<u>42.70</u>
Total		89	100.00	89	100.00
		Range	9.2-6.2 secs	Range	10.0-6.0 secs
		Mean	7.31 secs	Mean	7.28

Softball Throw For Distance. Test results on this item were above average. The mean score in the fall of 154'4" ranked above the 70th percentile on the national norm table. Although 33.71 percent were classified as poor, 15.73 percent were placed in the excellent group. During the spring testing there was a substantial improvement. The mean score improved by 7'2". Changes can be noted in the percentage of students in the satisfactory

classification from 21.35 percent in the fall to 11.24 percent in the spring while the poor rank remained the same as previously tested. This meant that those students lost from the satisfactory class had improved to the better areas of good and excellent. Three additional students were rated in the good class and six in the excellent class. Thus, eighteen students had improved their performance on the softball throw for distance to such a degree that they earned the right to be reclassified to another category of improvement. Of the students tested, 22.48 percent were rated as excellent which is one of the best performances of excellent ability of all the test items.

TABLE VIII
RESULTS OF THE SOFTBALL THROW FOR DISTANCE

Classification	Fall		Spring		
	Number	Percent	Number	Percent	
Excellent	95%	14	15.73	20	22.48
Good	80%	26	29.21	29	32.58
Satisfactory	60%	19	21.35	10	11.24
Poor	40%	<u>30</u>	<u>33.71</u>	<u>30</u>	<u>33.70</u>
Total		89	100.00	89	100.00
		Range	84'-213'	Range	50'-221'
		Mean	154'4"	Mean	161'6"

600 Yard Run-Walk. This test item indicated one of the greatest improvements of any part of the testing program even though the fall testing mean score of two minutes and fifteen seconds gave a class average that compared to approximately the 65th percentile on the national norm scale, while 65 of the students tested were of only satisfactory and poor ability.

Spring testing resulted in the following performances: a mean score of two minutes and one second, an improvement of 14 seconds over an already well established fall mean score, and a class average at the 80th percentile. This was the second best showing on any of the test items and was the second item that the class average fell in the good classification. The excellent classification had an increase of 25 students or 28.10 percent.

While the increase in the good area was from a previous 20 students to 33, both the satisfactory and poor categories were decreased in number by 29 and 9 respectively. This meant that 77 of 89 students tested improved to such a degree as to be reclassified into another area of improvement. The 32.59 percent of students with excellent ability was the second best showing in this entire testing program and the 37.08 percent who ranked good was the best for this classification.

TABLE IX
RESULTS OF THE 600 YARD RUN-WALK

Classification	Fall		Spring		
	Number	Percent	Number	Percent	
Excellent	95%	4	4.49	29	32.59
Good	80%	20	22.48	33	37.08
Satisfactory	60%	43	48.32	14	15.73
Poor	40%	<u>22</u>	<u>24.71</u>	<u>13</u>	<u>14.60</u>
Total		89	100.00	89	100.00
		Range 3:58-1:49 mins		Range 3:40-1:32mins	
		Mean 2:15 mins		Mean 2:01 mins	

CHAPTER VI

SUMMARY AND CONCLUSIONS

Summary. A careful analysis and evaluation was made of the results of the AAHPER Physical Fitness Test given for this report in order to make the findings as valid as possible. The tests were processed according to the age of the boys at the time of the fall testing and again according to the age of the boy at spring testing.

The freshmen boys at Lyons High School during fall testing on the average for all the test items at the ages

of fourteen and fifteen were at the 62nd percentile rank on the adopted AAHPER physical fitness norm scale. Although this is considered to be above average it is classified as a very low satisfactory ranking.

A closer analysis of the activities reveals that the mean score of 5 feet 9 inches in the standing broad jump was below the rank of one-half of the students for the corresponding ages tested in the United States and was of a poor classification. The average score of 10.72 seconds in the shuttle run was average for the norm scale used which also is considered poor by the AAHPER standards.

Results of the pull-up test and 50 yard dash were better than 60 percent of the students tested nationally while the mean score of 2 minutes 15 seconds in the 600 yard run-walk was exceeded by only 35 percent of the students tested nationally. Findings in the softball throw were of a satisfactory rank. The sit-up test was the best of the seven test items giving a class average of 72.87 sit-ups per person. This is a ranking at the 85th percentile which is a good rating for the class as a whole.

Those students tested did show substantial increases in performance of most events in the spring testing program as compared to fall results. While some mean scores of activities remained the same in percentile rate, there was a decline in performance by percentile rank in

one event, the 50 yard dash. Although the class mean score was improved by a trifling .03 second in the 50 yard dash, the increase in age of the students tested placed one-half of the tested group in the fifteen year age bracket. Thus, the improvement was not in proportion to age increase for the norms used causing a decline from the 60th percentile to the 55th percentile scored by the class mean. This was the only test item in which a decrease occurred.

The pull-up, sit-up, and softball throw for distance test items remained at the same percentile ranks as were previously scored in the fall testing. This was a satisfactory performance for pull-ups and softball throw for distance and a good rating for sit-ups.

Great improvements were made in the performance of mean scores and percentile rank by students in the spring testing in: the standing broad jump, which had previously been the lowest average performance of all test items, the shuttle run, and the 600 yard run-walk.

The seven inches increase in the mean score of the standing broad jump gave a twenty decile point increase and a classified satisfactory rank for the class average. The event improved by more percentile points than any other single event tested.

An improvement of .27 second in the shuttle run raised the class mean score out of the poor rating into a

satisfactory rating. Gains of fourteen seconds in the 600 yard run-walk increased the class mean score by fifteen percentage points to an 80th percentile rank and a good rating. In general, all spring testing mean scores of each test item were improved to some degree as compared to the first testing in the fall.

TABLE X

RESULTS OF THE PHYSICAL FITNESS TEST SHOWING AVERAGE SCORES, PERCENTILE RANK, AND IMPROVEMENT

Activity	Fall		Spring		Improvement
	Mean	Percentile	Mean	Percentile	
Pull-up	3.70	60	4.09	60	.39
Sit-up	72.87	85	80.61	85	7.74
Standing Broad Jump	5'9"	45	6'4"	65	7"
50 Yard Dash	7.31 secs	60	7.28 secs	55	.03 sec
Shuttle Run	10.72 secs	50	10.45 secs	60	.27 sec
Softball Throw	154'4"	70	161'6"	70	7'2"
600 Yard Run-Walk	2:15 min	<u>65</u>	2:01 min	<u>80</u>	14 secs
	Average	62		68	

Conclusions. When the National Youth Fitness Test was given in the fall to freshmen boys at Lyons High School, the students ranked consistently above the 50th percentile

in all events tested with the exception of the standing broad jump where they ranked only in the 45th percentile. By spring the students ranked above the 50th percentile in all events giving them a satisfactory rating for the pull-ups, standing broad jump, shuttle run, softball throw, a good rating for the sit-ups and the 600 yard run-walk, and a poor rating in the 50 yard dash.

While any good physical education program should include an adequate testing program of physical fitness, it must be realized that all tests of this nature have certain limitations. These limitations should not be considered as invalidating the test but rather an indication that the tests cannot be considered an all-purpose test and hence it might not be applicable in all situations.

From this study, the author's mean scores for the pull-up test item did indicate weakness in the muscles of the arms and shoulder girth of the body. This fact points out a need for more upper body activities such as tumbling, rope climbing, and activities on the parallel and high bars. Possibly an improvement could be made by the addition of a gymnastics horse for activity which would aid in strengthening of these muscle groups.

Apparent weaknesses of leg power were evident from the test results, particularly, the low satisfactory ratings of the standing broad jump in the fall and the poor rating of the 50 yard dash in the spring. The

explosive power muscles of the legs were affected in these events. Steps to improve this area should include more activities which require agility, endurance, and speed such as soccer and speedball, basketball, and playground games where leg usage is essential.

Ratings of a higher degree were obtained in the items of sit-up, softball throw, and 600 yard run-walk. The indication here is of a proficient strength in the trunk and hip flexors, fair power of the arm muscles, total body coordination, endurance of legs, and above average functioning of the cardio-respiratory system.

It should be noted that the good mean score in the 600 yard run-walk was probably improved by the use of a decathlon each spring in the physical education classes.

Although the study showed each test item mean score to be above average, considerable improvement needs to be and could be made in several items. This objective should always be one concern of the physical education teacher. Some type of testing for physical fitness with established norms as used in this study should always be a regular part of any program. Thus, a comparative study can be made of the results, and recommended changes or adjustments in the physical education programs of activities can be made on the basis of the fitness needs of the students.

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A COMPARATIVE STUDY OF THE PHYSICAL
FITNESS OF FRESHMEN BOYS AT LYONS HIGH SCHOOL
WITH THE NATIONAL YOUTH FITNESS TEST

by

Larry Lawrence Frisbie

B. S., Kansas University, 1957

AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Physical Education

KANSAS STATE UNIVERSITY
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Education has as one of its greatest concerns the health, physical development, and well being of all individuals. At times this concern has varied from a compulsory to a voluntary program. With the advancement of labor-saving devices, there has been a gradual decline in the physical fitness of the youth of our American society. This problem was brought to our attention by the findings of pilot study and research groups' random testing of the fitness of our youth. These facts prompted Presidents Eisenhower, Kennedy, and Johnson to activate youth physical fitness programs. National norms were constructed, and a youth fitness test was adopted. The norms ranked youths into four classifications of fitness: excellent, good, satisfactory, and poor.

The objective of this author's study is to provide data by comparing the test results obtained from the freshmen boys in Lyons High School at Lyons, Kansas with the national norms and classify them accordingly. The evaluation of these data are to serve as a means for planning the school's physical education program in the future.

The testing program included all events in the National Youth Fitness Test and consisted of two phases, a fall and a spring testing, for the school years of 1962-63 and 1963-64.

Results of the pull-up test produced a class standing of low satisfactory on the national scale.

A percentile rank of 85 was attained in the sit-up test item. This good rating was the highest of all tested items.

Standing broad jump was the only item below the national median during fall testing, but by spring, improvement was sufficient for a satisfactory 65th percentile rank.

The shuttle run improved from the 50th to the 60th percentile from fall to spring testing thus going from a poor to a satisfactory rating.

The only event that regressed was the 50 yard dash. It declined from the 60th percentile in the fall to the 55th percentile rank in the spring even though there was a very small increase in the class mean score. However, the rank was still above average nationally but was a poor showing.

Softball throw for distance was satisfactory with a 70th percentile mean score.

A test item with great improvement from fall to spring testing was the 600 yard run-walk. It rated at the 80th percentile, 15 percentile points above its earlier good score.

The entire testing program reveals that the boys in this study were considerably above the national average in all test items. However, some of the weaker muscle groups that were identified would suggest that more activities involving the muscles of the arms and shoulder girdle

should be utilized. Activities requiring leg power, speed, as well as agility and endurance need to be used more often.

Testing programs of this nature should always be a part of any physical education curriculum. They provide valuable data about the physical fitness of the students and serve as a guide for formulating the school's physical education program.