

Levels of Health-Related Physical Fitness
in Texas School Children (2011 to 2013)

A Report from the Texas Youth Fitness Project

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Overview and Summary of Key Findings

There is considerable interest in the levels of health-related physical fitness in children - by school administrators, policy-makers, researchers and public health leaders. The *Texas Youth Fitness Project*, represents the largest and most comprehensive evaluation of health-related fitness in youth to date. Data from across the state of Texas have been compiled by age and gender to provide descriptive information about the levels and patterns of health-related physical fitness in youth. Data on the percent of youth that attain the established FITNESSGRAM health standards provides a useful summary of the current status of fitness in youth. Evaluation of the patterns can provide an indicator of changes in levels of fitness over time.

The Cooper Institute has completed preliminary evaluation of the past three years of FITNESSGRAM data compiled by the Texas Education Association (2010/2011, 2011/2012, and 2012/2013). The data were screened for outliers and processed to ensure that data from schools were sufficiently representative to be included in the aggregated results. The resulting sample included data from 2,902,854 youth in 2011, 2,269,481 youth in 2012 and 4,039,365 youth in 2013. The percentage of youth achieving the Healthy Fitness Zone (HFZ) were examined by age and gender (and also across year) to provide insights about how fitness varies by age / gender and over time.

The results provide valuable baseline information to understand the current levels of health-related fitness in youth. The percent of youth achieving the Healthy Fitness Zone varied by test, grade and gender and these results were summarized with both narrative descriptions and figures. There were small but consistent increases in the average percent of youth achieving the HFZ between 2011 and 2013 but additional work is needed to better understand the school level factors that may explain variability in the population and over time. The results document the value of standardized collection of FITNESSGRAM data for youth fitness surveillance.

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Methods and Results

Senate Bill 530 (SB 530) requires all Texas schools to conduct fitness testing with FITNESSGRAM annually. This report summarizes the levels and patterns of health-related fitness from 3rd to 12th grade across the whole state using the aggregated grade-level data from the past three school years (2011-2013). The data were first screened to ensure that the data submitted from the individual schools were representative of their sample population of students. The screening procedure were designed to optimize the available sample size while minimizing the potential of bias within the sample ¹. The final criteria required that schools have at least 10 students from each grade but this was done separately for boys and girls to enable gender-specific analyses. This resulted in 6798, 6251, and 6228 grade level observations in the final dataset for 2011, 2012, and 2013, respectively. The evaluation focused on the percent of children that attained the established Healthy Fitness Zone (HFZ) by grade, gender and year. Some key summaries are provided below:

- Group level aerobic capacity HFZ achievement ranged from 64% to 92% in boys and from 67% to 88% in girls across grades (Figure 1). The average percent of youth achieving the standard declined with age in boys but this pattern was not evident in girls. Comparisons across years show clear evidence of increases in HFZ achievement from 2011 to 2013. The average % change from 2011 to 2013 was 5.1% in boys and 5.5% in girls.
- Group level BMI HFZ achievement ranged from 47% to 59% in boys and from 52% to 67% in girls (Figure 2). The average percent of youth achieving the standard declined from 3rd to 5th grade and then increased from 6th grade through 12th grade. In girls, the percent achieving the HFZ increased for all grades from 2011 to 2013 (average % improvement = 1.9%). In boys, increases in the percent achieving the HFZ were evident for 3rd to 8th grades (average % improvement = 0.3%).
- Group level upper body strength and endurance HFZ achievement ranged from 58% to 78% in boys and from 63% to 76% in girls (Figure 3). The average percentage of HFZ achievement declined consistently for boys from the 3rd through the 12th grade. The average achievement rates for girls increased from elementary years to middle school years and then decreased from middle school to high school years. The patterns over time reveal declines in HFZ achievement from 2011 to 2013 in 3rd to 5th graders but increases in 6th to 12th grades for both boys (average % change = 3.4%) and girls (average % change = 4.3%).
- Group level flexibility HFZ achievement ranged from 62% to 72% in boys and from 63% to 77% in girls (Figure 4). The average percentage of HFZ achievement tended to increase from elementary years to middle school years in both boys and girls. Achievement rates tended to decline in girls from middle school to high school but values remained stable for boys. Increases in the average percent of HFZ achievement were evident from 2011 to 2013 in both boys (average % change =3.8%) and girls (average % change = 3.0%). However, the pattern was inconsistent across three years with slightly lower achievement noted in 2012.
- Group level abdominal strength and endurance HFZ achievement ranged from 67% to 83% in boys and from 66% to 82% in girls (Figure 5). The average percentage of HFZ achievement remained stable across grade levels in both boys and girls except for declines in the high school years. The average percentage of

¹ The data screening procedures were based on methods used in the processing of data from the NFL PLAY 60 FITNESSGRAM Partnership Project (Saint-Maurice, et al., 2014). The refined method developed for this project will help to ensure standardization of outcomes and analyses while also facilitating comparisons with other state-level data.

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HFZ achievement remained stable from 2011 to 2013 in 3rd to 7th graders but an increase was observed for higher graders (10th -12th grades) for both boys (average % change =2.3%) and girls (average % change = 2.6%).

- Group level trunk extensor strength and flexibility HFZ achievement ranged from 80% to 92% in boys and from 83% to 93% in girls (Figure 6). The average percent of youth achieving the standard declined slightly from 3rd to 5th grade and then increased slightly from 6th grade through 12th grade in both boys and girls. There was no evidence of any appreciable changes in HFZ achievement between 2011 and 2013. However, there was a slight decrease observed in 4th and 5th graders for both boys (average % change = -0.1%) and girls (average % change = 0.3%).

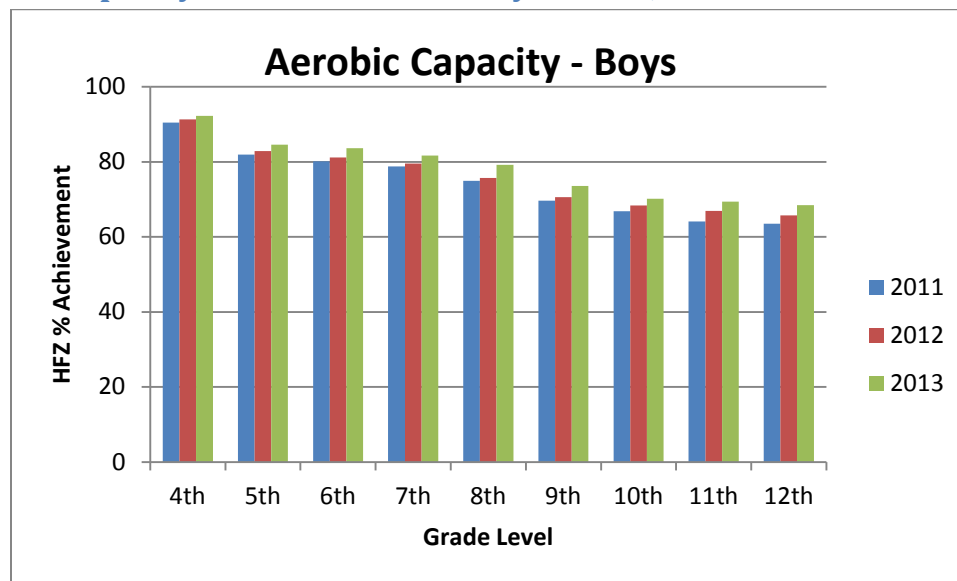
The descriptive data reported above provide useful reference values to characterize the levels of health-related physical fitness in Texas youth. There are no comparable state or national data to compare these values to so it is not possible to draw inferences about the magnitude of the values. It is also not possible to directly compare these values from 2011 – 2013 to previous published reports from the Texas Youth Fitness Project (Welk et al.) due to changes in the standards used to evaluate both aerobic capacity and body composition within FITNESSGRAM. The primary value of these results is to document the general range of HFZ achievement on the various assessments and to examine changes in age and gender patterns in these results. **It is important to note, however, that age and gender differences reflect differences in HFZ achievement and not necessarily actual differences in fitness.** For example, it is possible for girls to have higher HFZ achievement than boys due to differences in the levels defined in the criterion health standards. It is also possible for age related differences to suggest declines in fitness when in reality, fitness levels may have increased with age. This can (and will) occur because the criterion standards also vary by age/grade. The age and gender standards for aerobic capacity and body composition have been demonstrated to have clear utility for evaluating potential risk for metabolic syndrome (Laurson et al; Welk et al). Therefore, the distributions and patterns for these assessments have the strongest utility for evaluating health status in Texas youth.

The results of these analyses also provide preliminary views of the changes in HFZ achievement over the past 3 years of data. In general, there was evidence of small but consistent increases for most of the assessments over time although patterns varied by grade and gender. It is important to recognize that these patterns reflect secular changes in the average rates of HFZ achievement over the three years. The same screening and processing procedures were applied in all three years, however the results are cross sectional in nature and do not necessarily reflect longitudinal patterns. There were differences in the number and characteristics of schools submitting data each year so it is possible for differences to be due to variability in the sample. It is also possible for values to increase due to improved communication, familiarization with the tests or increased motivation of the students. Therefore, it is premature to draw inferences of increased health-related fitness based on these results. Additional analyses of longitudinal relationships (using data from matched schools) will enable patterns to be evaluated in more detail. Emphasis in these analyses will be placed on identifying factors that may account for improvements so that effective school level programming and policies can be disseminated to other schools.

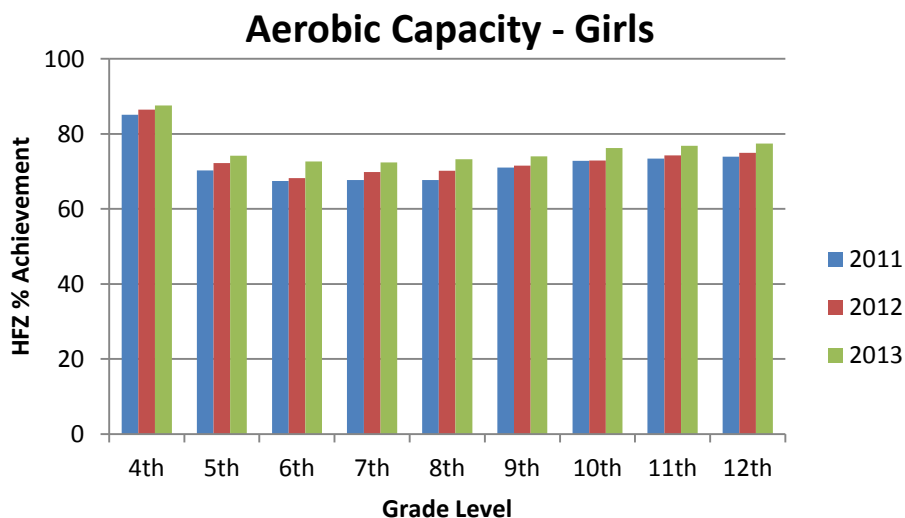
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Healthy Fitness Zone Achievement

Figure 1. Aerobic Capacity HFZ Achievement by Grade*, Gender and Year



	4	5	6	7	8	9	10	11	12
2011	90.5	81.9	80.1	78.7	75.0	69.6	66.8	64.1	63.6
2012	91.3	82.8	81.2	79.5	75.7	70.6	68.4	66.9	65.7
2013	92.2	84.6	83.6	81.7	79.2	73.6	70.2	69.4	68.5

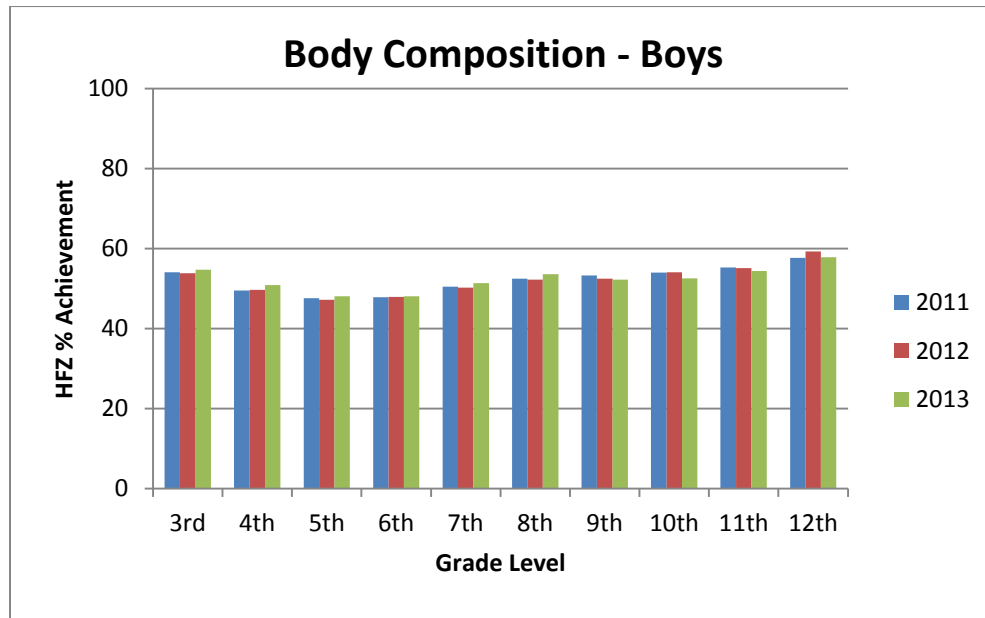


	4	5	6	7	8	9	10	11	12
2011	85.1	70.3	67.4	67.7	67.7	71.0	72.8	73.4	73.9
2012	86.5	72.2	68.2	69.8	70.2	71.6	72.9	74.2	74.9
2013	87.6	74.2	72.7	72.4	73.2	74.0	76.2	76.8	77.4

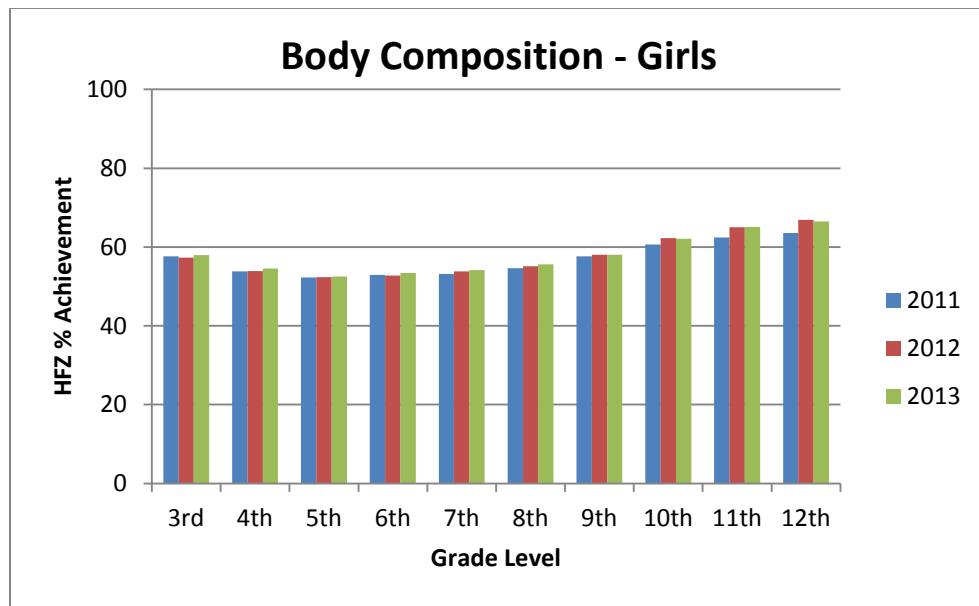
*Healthy Fitness Zone standards begin with 4th grade students for aerobic capacity, thus data from 3rd grade students were not included in this analyses as there are not comparative age appropriate standards.

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Figure 2. Body Composition (BMI) HFZ Achievement by Grade, Gender and Year



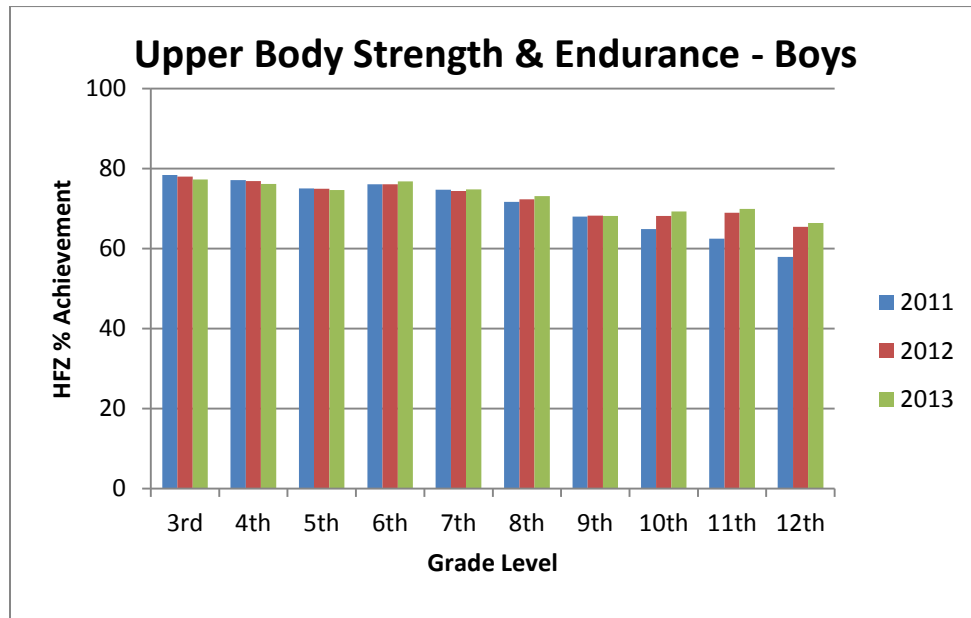
	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
2011	54.1	49.5	47.6	47.8	50.4	52.5	53.2	54.0	55.3	57.7
2012	53.8	49.6	47.2	47.9	50.2	52.2	52.5	54.1	55.1	59.3
2013	54.7	50.9	48.1	48.1	51.3	53.6	52.3	52.5	54.4	57.8



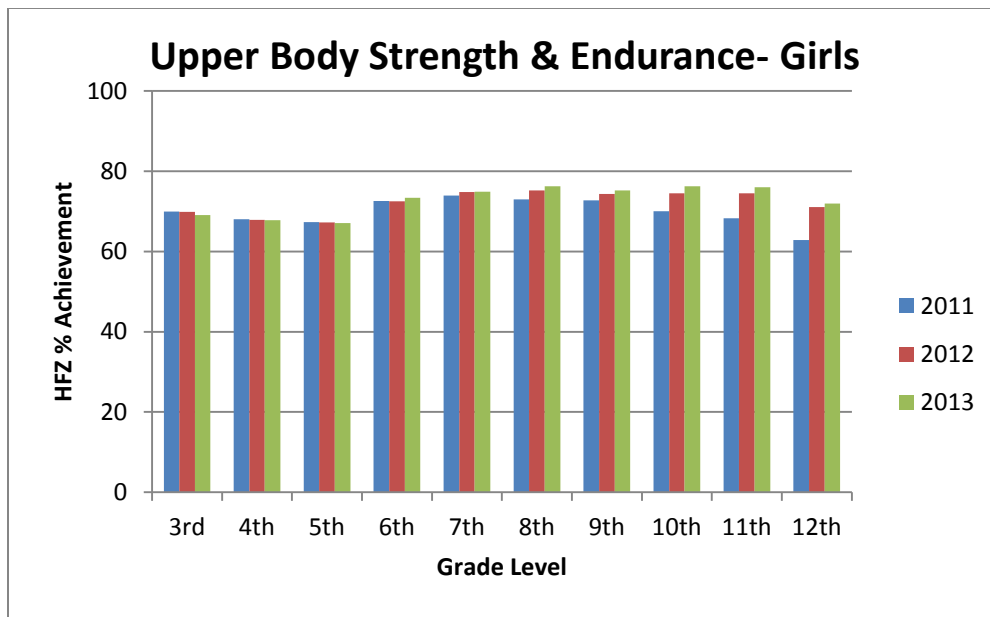
	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
2011	57.7	53.8	52.3	52.9	53.1	54.6	57.7	60.7	62.5	63.6
2012	57.4	53.9	52.4	52.7	53.8	55.1	58.0	62.3	65.0	66.9
2013	58.0	54.5	52.5	53.4	54.1	55.6	58.0	62.1	65.1	66.5

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Figure 3. Upper Body Strength & Endurance HFZ Achievement by Grade, Gender and Year



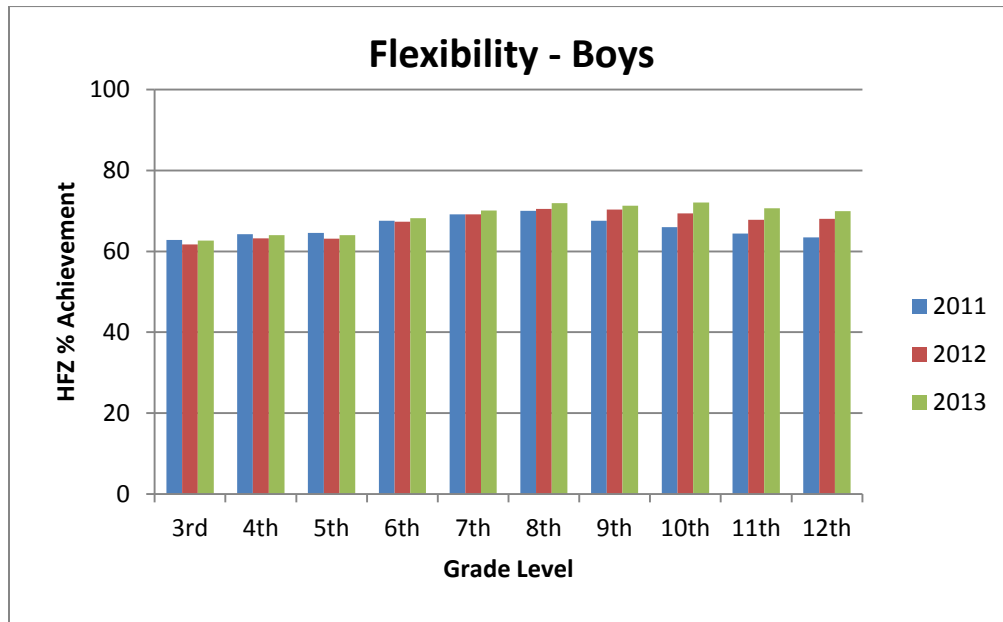
	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
2011	78.4	77.1	75.1	76.1	74.7	71.7	68.0	64.8	62.5	57.9
2012	78.0	76.9	75.0	76.1	74.4	72.3	68.3	68.2	68.9	65.4
2013	77.3	76.2	74.6	76.8	74.8	73.1	68.1	69.3	70.0	66.4



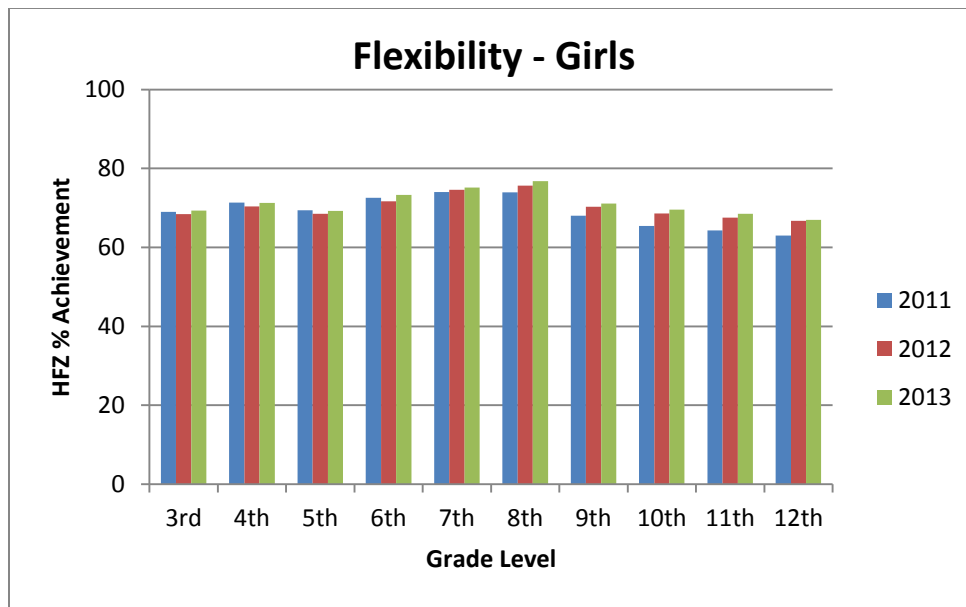
	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
2011	69.9	68.0	67.3	72.6	74.0	73.0	72.7	70.0	68.3	62.9
2012	69.9	67.8	67.2	72.5	74.8	75.2	74.3	74.5	74.5	71.1
2013	69.1	67.8	67.1	73.4	74.9	76.3	75.2	76.2	76.0	72.0

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Figure 4. Flexibility HFZ Achievement by Grade, Gender and Year



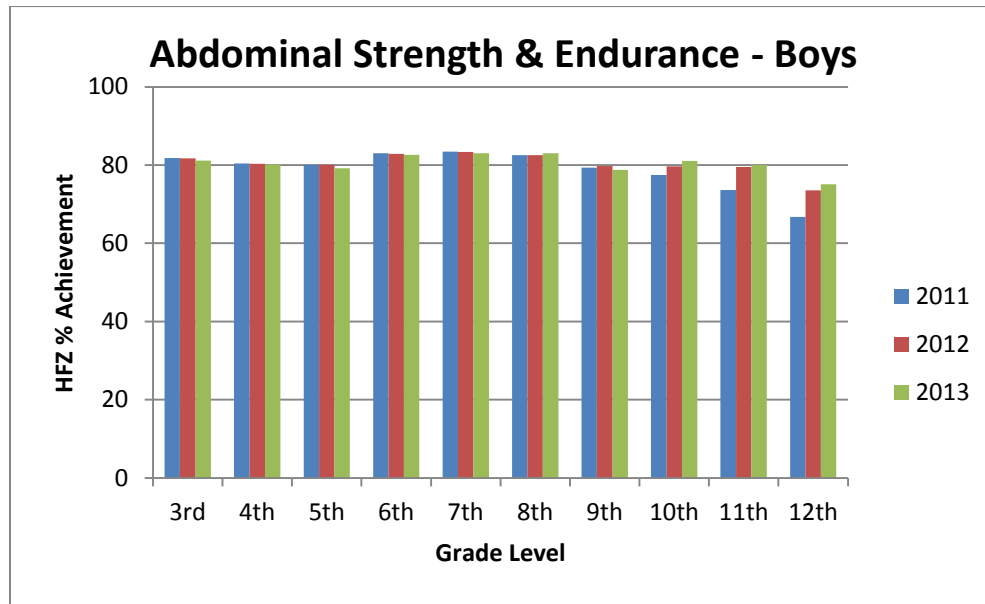
	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
2011	62.8	64.2	64.6	67.6	69.1	70.0	67.5	66.0	64.4	63.5
2012	61.7	63.2	63.1	67.3	69.2	70.5	70.4	69.4	67.8	68.0
2013	62.7	64.0	64.0	68.2	70.1	71.9	71.3	72.1	70.7	69.9



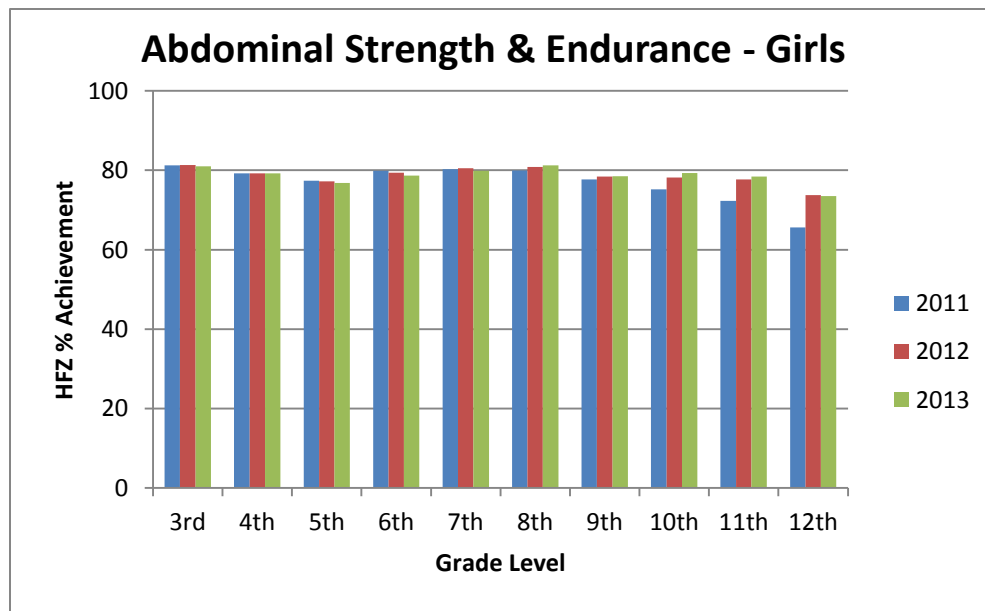
	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
2011	69.0	71.4	69.4	72.6	74.0	74.0	68.1	65.4	64.3	63.0
2012	68.4	70.4	68.5	71.7	74.6	75.7	70.3	68.6	67.6	66.7
2013	69.3	71.3	69.2	73.3	75.2	76.8	71.1	69.6	68.5	67.0

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Figure 5. Abdominal Strength & Endurance HFZ Achievement by Grade, Gender and Year



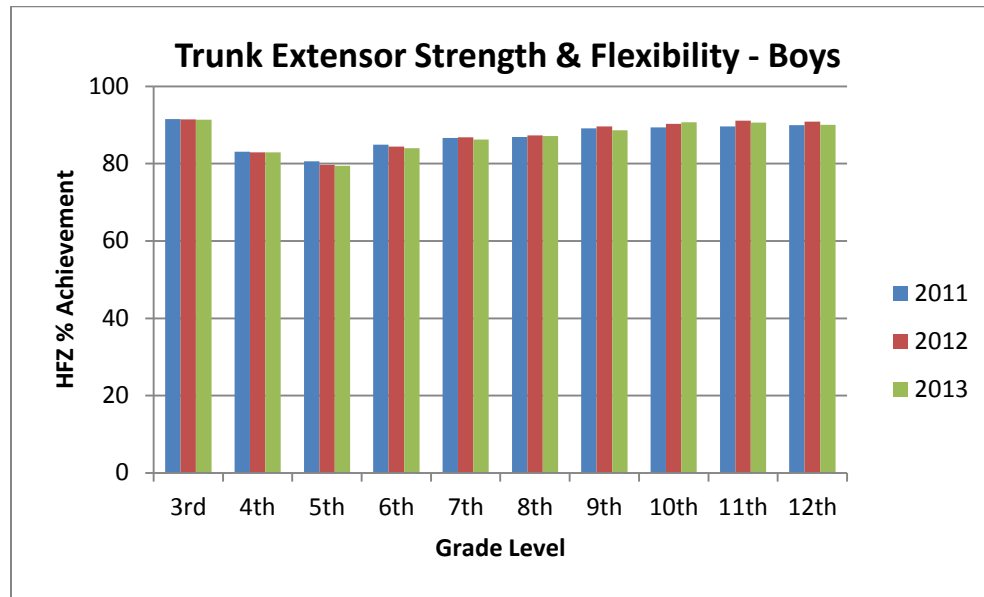
	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
2011	81.8	80.4	80.1	83.1	83.4	82.5	79.3	77.4	73.6	66.7
2012	81.7	80.3	80.1	82.9	83.4	82.6	79.7	79.7	79.5	73.6
2013	81.1	80.2	79.2	82.7	83.0	83.1	78.8	81.1	80.0	75.1



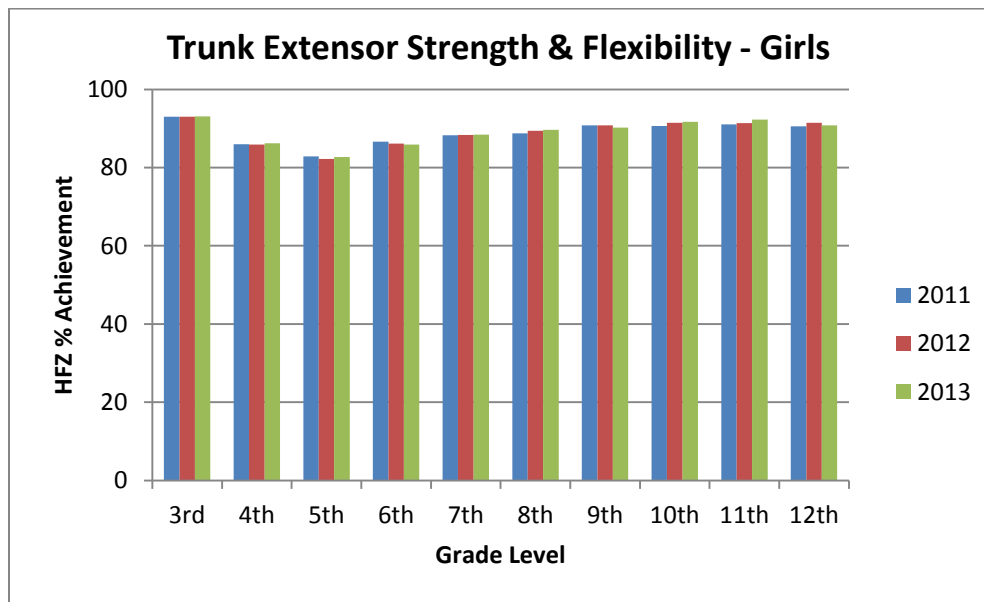
	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
2011	81.2	79.3	77.3	79.9	80.3	80.0	77.7	75.2	72.3	65.6
2012	81.3	79.3	77.2	79.4	80.5	80.8	78.4	78.2	77.7	73.8
2013	81.0	79.2	76.8	78.7	79.9	81.3	78.5	79.3	78.4	73.5

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Figure 6. Trunk Extensor Strength & Flexibility HFZ Achievement by Grade, Gender and Year



	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
2011	91.5	83.1	80.6	84.9	86.7	86.9	89.1	89.4	89.6	90.0
2012	91.5	83.0	79.7	84.4	86.8	87.3	89.6	90.3	91.1	90.9
2013	91.3	82.9	79.5	84.0	86.2	87.1	88.6	90.7	90.6	90.0



	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
2011	93.0	86.0	82.9	86.7	88.3	88.7	90.8	90.6	91.1	90.6
2012	93.1	85.9	82.2	86.1	88.3	89.5	90.8	91.4	91.4	91.5
2013	93.1	86.2	82.7	85.9	88.4	89.7	90.2	91.7	92.3	90.8