

Physical Activity Levels Associated With Physical Education Classes

By

Sandra R. Martinez

B.S. Exercise Science and Health Promotion, Colorado State University – Pueblo, 2001

THESIS

Submitted in Partial Fulfillment of the
Requirements for the Degree of

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"Physical Activity Levels Associated With Physical Education Classes", a thesis prepared by Sandra R. Martinez in partial fulfillment of the requirements for the degree, Masters of Art in Human Performance and Physical Education, has been approved and accepted by the following:

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Chapter 1

INTRODUCTION

A goal of physical education programs should be to structure classes that address the health needs of students. In the educational magazine, *Edutopia*, there was a focus on the impact of declining student health and a discussion of possible solutions. Schibsted (2006) discussed the health of young people in school. In "Weighty Matters" Schibsted discussed many of the health problems that are associated with childhood obesity and inactivity. According to Schibsted, the author of this article, there are several ways schools can help children keep their weight under control. Possible solutions include cutting back on vending machine junk food, healthier lunch meal choices, and incorporating more meaningful activity into the school day. Physical education classes seem to be an appropriate place to fit more meaningful activity into the school day. Physical Education instructors have the opportunity to help lead the way in making changes to help students deal with health problems. The United States Department of Health and Human Services supports the idea of getting students active during the school day. The Healthy People 2010 document promotes the idea that physical education is the ideal place to allow young people the opportunity to improve their health (United States Department of Health and Human Services, 2000).

Physical activity is the main goal of most physical education classes. There are also other important goals such as improving agility, balance, coordination, power, reaction time, speed, cardiovascular endurance, flexibility, and muscular strength. Physical education professionals plan instruction and activities that aim to meet all of these goals. There are standard tests physical education instructors can use to test agility, balance, coordination, power, reaction time, speed cardiovascular endurance, flexibility, and muscular strength.

However, most physical education programs do not currently test how physically active students are during class.

The National Education Association (NEA) has its own magazine, the *NEA Today*. According to an article in the *NEA Today*, written by Crute (2005), nine million American children are either overweight or obese. This weight issue is having a huge impact on the health of children in this country. David Ludwig, M.D. is the director of the obesity program at Children's Hospital in Boston Massachusetts. He said, "Epidemic is absolutely the correct word for it" (Crute, 2005, p.22). The increasing weight problems of America's youth impacts not only a student's physical education experience but other areas of learning as well. Crute (2005) discussed the results of several studies that pointed to the impact this weight issue has had on learning. "A University of Miami survey for example, found that fit high school seniors had higher grade point averages and less depression than their peers" (Crute, 2005, p.26). These young people with weight issues are more at risk for developing cancer, Type II diabetes, and heart disease along with many other health problems (Crute, 2005). According to the United States Department of Health and Human Services (2000), schools and physical educators need to come up with effective plans to deal with this crisis in education that is limiting student learning and lowering their quality of life. Ensuring that all students enrolled in physical education classes are given the opportunity to be physically active during each class should be a big priority.

The Healthy People 2010 document published by the U.S. Department of Health and Human Services (2000) claims that almost fifty percent of Americans between the ages of twelve and twenty are not active on a regular basis. Physical education is thought to be the best mode to provide activity for young Americans by many health professionals. In fact the

Healthy People 2010 document addresses the role physical education needs to play in the health crisis facing American youth. One recommendation (objective 22.8) in the Healthy People 2010 proposal was, "Increase the proportion of adolescents who spend at least 50 percent of school physical education class time being physically active" (U.S. Department of Health and Human Services, 2000, p. 22-21). Another objective (22.10) that relates to physical education is, "Increase the proportion of the Nation's public and private schools that require daily physical education for all students" (U.S. Department of Health and Human Services, 2000, p 22-19).

An important goal for physical education professionals should be to determine the best methods to help their students improve their health. According to the American College of Sports and Medicine (ACSM), in the ACSM's Guidelines for Exercise Testing and Prescription (5th edition, 1995), the recommended minimum length of physical activity is twenty minutes. Physical education professionals need to try to determine the amount of time students are physically active during each class session to assess whether or not the recommendations of the ACSM are being met, and also to determine if objective 22.10 of Healthy People 2010 is being met. As stated earlier, objective 22.10 is to "increase the proportion of adolescents who spend at least 50 percent of school physical education class time being physically active," (U.S. Department of Health and Human Services, 2000, p 22-19). In order to provide students with the best opportunities to be active it would be necessary to determine which types of activities help students maintain the highest levels of physical activity. Since students come into the physical education classes with different fitness levels it would also be useful to determine which types of activities help students with

different fitness levels meet objectives of Healthy People 2010 and the recommendation from the ACSM regarding the length of time spent physically active.

Statement of the Problem

How do physical educators know which types of classes students are most likely to be highly active in? The problem is physical education professionals do not know which types of physical education classes are middle school students most physically active in, as assessed by time in target heart rate zone, measured by heart rate monitors.

Purpose of the Study

The purpose of this study was to determine which type of physical education class activity helped sixth grade students best meet or exceed the goal of spending at least fifty percent of class time in the target heart rate zone.

Research Questions

The research question asked which physical education class, aerobics, team sports, or student choice activities result in sixth grade students spending the largest percentage of class time in the target heart rate zone. A secondary question asked whether or not current cardiovascular fitness levels impact the amount of time students spend in the target heart rate zone in the three different types of classes.

Research hypotheses

The first research hypothesis was there would be a difference in the percentage of time spent in the target heart rate zone in the three types of physical education classes (team sports, aerobics, or student choice). The next three research hypotheses looked at differences between the three fitness levels (low, average, high) within each of the three types of physical education classes. The first hypothesis was there would be a difference in the

percentage of time spent in the target heart rate zone among the three fitness level groups (high, average, low) during the team sports classes. The next research hypothesis concerns the two aerobics classes. The hypothesis was during the completion of aerobics classes there would be a difference in the percentage of time spent in the target heart rate zone among the three fitness level groups (high, average, low). The last research hypothesis from this group was there would be a difference in the percentage of time spent in the target heart rate zone between the three fitness level groups (high, average, low) during the completion of the student choice class.

The last three hypotheses looked at differences within each of the three fitness levels during completion of the three types of physical education classes. The first of this group of three hypotheses was completion of the student choice activity would result in the high fitness students spending a higher percentage of time in the target heart rate zone compared to the team sports and aerobics activities. The next hypothesis was the average fitness students would spend a higher percentage of time in the target heart rate zone during the completion of the team sports class compared to the other two types of classes. The last hypothesis for this study was the low fitness students would spend a higher percentage of time in the target heart rate zone during the aerobics classes than in the team sports or student choice classes.

These last three hypotheses were developed by reviewing average student participation scores from previous sessions of aerobics, team sports and student choice classes. The students earn daily participation points in the physical education classes. The points earned by the participants from previous aerobics, student choices, and team sports classes were reviewed to determine which type of class each fitness level group would spend

the highest percentage of total class time at or above 70% of age predicted maximum heart rate. The high fitness students had the highest participation points during the student choice classes compared to aerobics and team sports that were taught prior to the start of the study. The average fitness students had the highest average participation points during completion of the team sports classes compared to the aerobics and student choice activity prior to the beginning of the study. The low fitness students had the highest average participation points during the aerobics sessions compared to the other activities during the physical education classes prior to the start of the study.

Independent and Dependent Variables

The independent variable was the types of physical education classes the students were participating in: aerobics, team sports, or student choice. A categorical variable was the fitness levels of the participants. The dependent variable was the percentage of class time students spent in the target heart rate zone, which was defined as heart rates at or above 70% of age predicted heart rate maximum or 146 beats per minute for these twelve year old participants.

Delimitations

A delimitation of the study was that there were only sixth grade students from one middle school participating in the study. A second delimitation was that all classes were taught by the same instructor. Another delimitation of the study was that there were only three types of physical education classes included in the study. The three types of classes were team sports, aerobics, and a student choice lesson plan. The study was further delimited by limiting the team sports classes to two types of team sports, basketball and soccer. The aerobics classes were also delimited to Tae-Bo and circuit training.

Limitations

A limitation was only potential participants whose parents attended an informational session and signed an informed consent could participate in the study. This limited the subject pool for participation in this study. The participants might have been influenced to work at a different level during the days they were wearing the heart rate monitors which was a limitation of the study. To control for this possible limitation pieces of masking tape were placed over the monitor to prevent students from viewing the data and comparing it with other participants during the data collection.

Assumptions

An important assumption was that the Polar Vantage XL accurately measured the heart rate of each participant. It was also assumed that the participants of this study were representative of sixth grade students. The assumption was made that all of the students in the study participated to the best of their ability during each day of data collection.

Definitions of terms

For the purpose of this study the target heart rate zone was defined as heart rates that were at or above 146 beats per minute. The appropriate level of physical activity was determined by using the percentage of maximal heart rate method (Powers & Howley, 2004, p. 314). The average age of participants in this study was 12 years old. Using the accepted method of $220 - \text{age}$, the average heart rate maximum for this study was 208 beats per minute (BPM). Therefore using the percentage of maximal heart rate method, the number 208 was multiplied by 70% to determine the minimum target heart rate. By using this method, the minimum heart rate for this study was set at 146 beats per minute (BPM). The

desired heart rate range for this study (146 BPM and higher) was referred to as the target heart rate zone.

The appropriate amount of time in the target heart rate zone is fifty percent of total class time. According to a 1995 report by the American College of Sports Medicine in order to improve aerobic fitness, activities must be at least twenty minutes in duration. The average activity time in the physical education classes at La Junta Middle School, where this study took place, is forty five minutes.

Cardiovascular fitness levels were determined by having all participants complete a one mile endurance run/walk test. After the test was completed, the results for each participant were compared to the normative data from the Presidents Challenge Physical Fitness test (1999). Participants' cardiovascular fitness levels were classified as high, low, or average based on how each participant's results compared with the normative data.

Summary

The problem that was addressed in this research study was whether or not young people are active enough during physical education classes to help prevent serious health problems that impact their quality of life. The purpose of this study was to determine what types of physical education classes allow middle school students the best opportunity to improve their fitness level. This study is significant because it helps determine if physical education students in La Junta Middle School are meeting one of the two objectives for physical education classes set by the United States Health and Human Services department in Healthy People 2010. The results from this study may suggest to middle school physical education professionals what types of activities give students the best opportunity to meet the Healthy People 2010 goal of being physically active for at least 50% of class time.

Chapter 2

LITERATURE REVIEW

Introduction

The search for research articles that assessed activity levels of students in physical education classes using heart rate monitors did not yield very many results. This literature review includes studies that used four different tools to assess activity levels of students. Some of the studies were comparing different assessment techniques to see which was the most accurate. Two of the studies were investigating the effectiveness of two different types of lesson plans to determine which lesson plan was the best at helping students achieve high activity levels during physical education classes. The one theme that runs through all of the literature reviewed here is that regardless of the type of assessment being used or the reason for the testing, all of the studies discussed in this chapter look at the activity level among students in a physical education setting.

Eight studies were located that investigated the physical activity levels of students in physical education classes. The education level of the participants ranged from preschool aged children to college aged adults. Within the eight studies there were four different types of assessments used. There were a total of 504 participants in six of the studies. Two of the studies did not contain information about the number of participants but rather the number of classes involved in the research. There were a total of 35 classes in those two studies. A summary of these eight studies reviewed is shown in Table 1.

Table 1
Summary of Literature Review

Authors	Year of Publication	Participant Age	Gender	Activity	Results (% of time physically active)
Quinn & Strand	1995	12 - 13	Males	Football	34% - 49.6%
Scarffing & Duggdale	1998	15 - 16	Females	Badminton	0.64% - 14.7%
Sutton	1997	9 - 15	Males and Females	Netball, Soccer, Gymnastics, Handball, Badminton, Fitness, Track, Volleyball, and Dance	Average 32.7%, Range 7.8% - 58.5%
McIntyre	1999	Middle School students	Males and Females	Main focus Skill practice	8%
Arnett	2001	20 years old	Females	Soccer	55% - 65%
Arnett	2001	High school students	Females	Soccer and hockey	Average 56%, Range 51% - 62%
Arnett	2001	3 rd , 4 th , & 5 th grade students	Males and Females	Indoor physical education classes	29.4% - 42.4%
Louie & Chan	2003	3 - 5	Males and Females	Student choice free play	Activity levels of 2 (low) and 3 (moderate)

Time in the Target Heart Rate Zone by Age Groups

The age of participants in this literature review ranges from a mean of 4.2 years old (Louie & Chan, 2003) to a mean age of 20 years old (Arnett, 2001). The study performed by Louie and Chan (2003) evaluated physical activity levels of preschool children in Hong Kong. The results of the study indicated that preschool children fell into level two and three, which is considered to be low to moderate activity during all sessions of their physical education classes, which corresponds to activities such as walk/running or climbing (Louie & Chan, 2003).

There were two studies that compared activity levels by age. The first study was with participants in the 3rd, 4th, and 5th grades. This was a longitudinal study that tracked

participants for three years (Levin, McKenzie, Hussey, Kelder, & Lytle, 2001). In third grade the students were in the target heart rate zone set for this study for 9.5 minutes per lesson or 29.4% of the total class time. In fourth grade these same students were in the target heart rate zone for 11.5 minutes or 35.1% of the total class time. In fifth grade the students spent 42.4% or 13.5 minutes per lesson in the target heart rate zone. Since the same group of students was tracked for three years this research design was useful to examine if the increases in time spent in the moderate to vigorous physical activity range each year was because of the increasing age of students. The other study located that investigated the impact of age on time spent in the target heart rate zone (Stratton, 1997) was a cross-sectional study and had an age range of students from nine to fifteen years old. This study showed an increase in time spent in the target heart rate zone from nine years old through twelve year olds, and then a decrease in time spent in the target heart rate zone from twelve year old to fifteen year old participants (Stratton, 1997).

The study with twelve to thirteen year old males (Quinn & Strand, 1995) reported percentages of time in the target heart rate zones between 34% and 49.6%. The Quinn and Strand (1995) study seems to be very similar to the percentages of time in the target heart rate zone reported in the 1997 study by Stratton for that age group. The percentage of time in the target heart rate zone of the Quinn and Strand (1995) study are also slightly higher than the study by Levin et. al (2001) which would seem to agree with the trend of increasing percentages of time in the target heart rate zone with each subsequent year in school. The fifteen and sixteen year old students in the study by Scantling and Dungdale (1998) reported the percentage of time in the target heart rate zone ranged from 0.64% to 14.7%. These percentages were close to the findings from Stratton (1997) for the fourteen and fifteen year

old age group (10%). Based on the studies reviewed so far there seems to be a trend similar to that reported by Stratton (1997) that showed an increase in time spent in the target heart rate zone until age twelve and then a decrease in the following years.

However, there were a few studies that reported findings that did not seem to agree with that trend. The study by Keating (1999) with middle school students found the percentage of time in the very active phase to be only 8% of total class time. The study by Arnett & Lutz (2003) with eighth grade females (age is estimated to be between 13 and 14 years) reported the average time spent in the target heart rate zone set for that study to be 56%, which is much higher than most of the other studies investigated for this literature review. The other study with Arnett (2001) involved the oldest group of participants in the literature reviewed (mean = 20 years old). It is interesting to note that the percentage of time in the target heart rate zone recorded for one of the two groups in that study was 65%. That is a high percentage of time in the target heart rate zone compared to the other studies and it seems to contradict the findings that after age twelve the activity levels decline.

Time in the Target Heart Rate Zone Compared to Types of Activities

The types of activities taught in the class might have an impact on the percentage of time spent in the target heart rate zone. The study titled, "Children's Heart Rates During British Physical Education Lessons," by Stratton (1997) collected data during several different types of physical education classes. For a full list of activities refer to Table 1. The results of this study were that dance, track & field, and fitness were the three activities that students spent the lowest percentage of total class time in the target heart rate zone, while handball, soccer, and netball were the classes that students spent the largest percentage of time in the target heart rate zone. The only two classes that students were in the target heart

rate zone for this study for more than 50% of class time were soccer and netball. However, when reviewing the results from this study, gymnastics is listed two more times with different percentages of time in the target heart rate zone. In fact there are several activities including fitness and general PE that are listed in the results section more than once. There is not adequate information about what helped the participants in one gymnastics lesson achieve heart rates in the target heart rate zone for 58.5% of total lesson time and another gymnastics class only spent 7.8% of total class time in the target heart rate zone (Stratton, 1997).

The study by Levin and colleagues (2001) did not state what the activities from all of the lessons were, but there was some information about percentages of class time devoted to fitness and game play during the three years of the study. During the fifth grade year the students spent a larger percentage of time in game play, about 10% more than in the previous years. The fifth grade year the students also spent 5% less time devoted to fitness (Levin et al., 2001). With the intermediate elementary age group it would seem that more class time devoted to game play and less to fitness resulted in achieving higher percentages of class time in the target heart rate zone. A good question for further research would be whether or not increasing game play with a middle school population would increase the percentage of time spent in the target heart rate zone like it did with the elementary age group in this study.

The activity in the 1995 Quinn and Strand study was football. There were two different lesson plans used in this study. The first one focused on skill play and the participants in that group spent 34% of class time in the target heart rate zone. The second group of students had ten minutes of fitness included in the lesson plan and they were in the target heart rate zone for 49.6%. A similarly designed study was completed by Scantling &

Dungdale (1998). The activity for that class was badminton and the time in the target heart rate zone for the skill play group was 0.6%. The group with ten minutes for fitness spent 14.7% of class time in the target heart rate zone. Based on the results of these two studies, including a fitness focus in the lesson plan greatly increases the amount of total class time students spent in the target heart rate zone.

There were two studies that looked at small sided games during sports based lessons. The first study was a small study with female college students to collect pilot data for the second study (Arnett, 2001). The college students were tested for two small sided game based lessons and both of the lessons focused on soccer. The second study with middle school girls collected data from soccer and hockey lessons (Arnett & Lutz, 2003). The mean percentage of time spent in the target heart rate zone for the college students ranged from 55% to 65% (Arnett, 2001). In the second study with middle school girls, the percentage of time in the target heart rate zone was 56% of the total class time (Arnett & Lutz, 2003). Both of these studies observed participants involved in small sided game based lessons. The percentage of class time in the target heart rate zone was higher in this study than most of the studies reviewed. It would seem that small sided games during sports based lessons are effective at allowing students to achieve higher percentages of total class time in target heart rate zone.

Another point to consider is the length of the physical education classes. The American College of Sports Medicine in a 1995 report stated a minimum of 20 minutes of physical activity was necessary to improve aerobic fitness. The study by Quinn and Strand (1995) reported class length was 35 minutes long and the percentage of time in the target heart rate zone ranged from 34% to 49.6%. Thus, the participants in that study did not meet

the twenty minute goal. The participants in the Scantling and Dungdale study (1998) were not in the target heart rate zone for twenty minutes either. In the study by Keating (1999) the length of the class is not reported, however the students were only classified as being very active for 8% of class time. The classes would need to be 250 minutes long for students to meet the goal of being in the target heart rate zone for twenty minutes. In the study by Arnett (2001) the students were in the target heart rate zone for 55% to 65% of class time but the classes were only twenty minutes long. The 2001 study by Levin and colleagues reported an average class length of thirty three minutes and the largest percentage of class time in the target heart rate zone was 42.4%, so this study also failed to meet the American College of Sports Medicine objective of twenty minutes.

Fitness Levels Compared to Time in the Target Heart Rate Zone

Both of the studies that used small sided game based lesson plans looked at the fitness levels of the participants (Arnett, 2001; Arnett & Lutz, 2003). These were the only two studies reviewed that compared fitness levels to percentage of time spent in the target heart rate zone during physical education classes. Unfortunately, both of the studies only involved female participants and only looked at one type of class, a sport based class. The Arnett (2001) study reported low fitness and high fitness students spent 65% of class time in the target heart rate zone and the medium fitness students spent 55% of class time in the target heart rate zone. The second study (Arnett & Lutz, 2003) showed low fitness students were in the target heart rate zone for 51%, intermediate 55%, and high 62% of total class time in the target heart rate zone.

Summary

Based on the amount of variability within these eight studies, much more research is needed to determine the cause of the variability and determine solutions to increase the percentage of time in the target heart rate zone in all physical education programs to at least 50% of class time in order to meet the goals set by Healthy People 2010. The literature review revealed important information about the amount of class time spent in the target heart rate zone of students in preschool through college during physical education classes. However, there are still some questions that need to be answered. The majority of the studies reviewed did not provide enough information about the lesson design. The percentage of time spent in the target heart rate zone varied from 0.6% to 65% of class time. Why is there so much variability? Most of the activities that students participated in were team sports based activities. Since one study pointed to a trend of increasing time in the target heart rate zone for each year in third through fifth grade, it might be helpful for a middle school physical education teacher to know whether or not the increase will continue for sixth grade.

The review of literature answered some important questions about percentage of time in the target heart rate zone in a school physical education setting. The research study involving preschool aged participants reported information on activity levels during free play time related to age, gender, and size of play space (Louie & Chan, 2003). The question that arises from this research is, what is the reason students were in the low to moderate activity level? Is it because of their age? Is it because of the fact that all activities were student choice?

There was not one study located that looked at a male and female sixth grade population exclusively. There was very little information regarding the fitness level of the participants and whether or not fitness level had an impact on time in the target heart rate zone. There was not enough detail given about the lesson plans. Information about how the activities were taught would be important for physical education professionals who were trying to find ways to improve the percentage of time in the target heart rate zone of students enrolled in their classes. Very few of the research studies reviewed showed time spent in the target heart rate zone to be at or above 50% of total class time, or met the ACSM recommendation of 20 minutes of physical activity.

Chapter 3

METHODOLOGY

Introduction

The purpose of this study was to determine which type of physical education class activity would help sixth grade participants best meet or exceed the goal of spending at least fifty percent of class time in the target heart rate zone. The goal of Healthy People 2010 was, "increase the proportion of adolescents who spend at least 50% of school physical education class time being physically active." (United States Department of Health and Human Services, 2000, p 22-21). The question that was investigated is which types of physical education classes (team sports, aerobics, or student choice) are middle school students most physically active in, as measured by heart rate monitors.

Settings

The setting for the study was a public middle school in La Junta, Colorado. The facilities included one gymnasium, and a large outside field, one multipurpose room, a field house that is approximately a quarter mile from the school, and a track that is next to the fieldhouse. The multipurpose room has one multi-station weight lifting machine and several curl bars. The fieldhouse has weight lifting equipment. There is enough equipment for two classes of twenty-five students to play basketball, softball, soccer, football, or volleyball at the same time. There is also enough equipment for two classes to complete an aerobic workout with aerobic step boxes, jump ropes, agility bounce balls, one agility ladder, medicine balls, and cones.

All of the classes in the study were taught by the same teacher. The physical education teacher is in her fifth year of teaching. She has a Bachelors of Science from

Colorado State University – Pueblo in Exercise Science Health Promotion with a minor in K-12 education. She holds a professional license from the state of Colorado. The area of endorsement on the license is Physical Education and the grade levels are K-12.

Participants

The student population at La Junta Middle School was 48% male and 52% female. The participants in this study were 64% male and 35% female. There were 125 students who had the opportunity to volunteer to participate in the study. Out of the 125 students, eighteen volunteered to participate in the study. All of the students in the study were sixth grade students. The age range of the students in the sixth grade is between eleven and thirteen years. The average age of the participants in this study was 11.65 years old. The participants had the opportunity to complete two team sports classes, two aerobics classes, and one student choice class. The students were scheduled to attend physical education classes every day for the entire academic year. Physical education is a required course for sixth grade students at La Junta Middle School. The students were in the second semester of physical education and were familiar with class procedures and expectations.

Instruments

The first instrument was the Presidential Fitness Test Standards. The tests measure five areas of fitness. For this study only one fitness test was used. The one mile endurance run/walk test was administered to students prior to the use of the heart rate monitors. The test was conducted to categorize each participant's cardiorespiratory fitness level. The procedure for the test was simple. Students were timed during the completion of a one mile run/walk endurance test. The normative data results for the Presidential Fitness test are shown in Appendix A. The Presidents Council on Physical Fitness and Sports started using

these tests to determine the levels of fitness for physical education students in 1966 (www.fitness.gov/). The reason for using this test was to compare whether current cardiovascular fitness levels impact how much time is spent at or above the target heart rate during participation in different types of physical education classes.

The second instrument that was used was a heart rate monitor. Each participant wore a heart rate monitor. The brand was Polar and the model was Vantage XL. There was a wrist strap that received a signal from the chest transmitter. Before data collection began some modifications had to be made to the watches and computer interface device in order to get them operational. The original computer interface software was compatible with a Macintosh computer that had a round serial data port. Unfortunately all three copies of the software licensed to East Otero Colorado School District would not operate. Polar has a newer version of software that was designed for the E series line of watches which can be used with the older Vantage XL watches. The computer interface device was not compatible with an IBM computer and so the cable that connects the interface to the computer had to be replaced with a cable that had a USB connection. With the modifications made to the cable, changes made to the computer settings and a newer version of the software, the Vantage XL heart rate monitors could be used to collect and record data from the participants.

Procedures

The physical education classes were fifty five minutes long. Three to five minutes of class time was used to allow students to change clothes for class and then at the end of class, three to five minutes of additional class time was used to allow students to change back into school clothes. Excluding the time spent in the locker room changing clothes the average physical education class is forty five minutes long. Classes usually began with attendance

being taken followed by announcements. The next step was for students to get changed into their workout clothes. Students then began a warm up that lasts three to five minutes. The warm up was usually running, walking, jumping rope, or playing a tag game. Students were then led by the instructor through a series of flexibility exercises. The students then complete abdominal exercises and push ups. The next phase of class was usually teacher led instruction and demonstration. After that, students in a sport based lesson would practice the focus skill and then play a small sided lead up game. In an aerobics class, students would work individually to complete the aerobic workout. In a student choice class, students would select an activity to participate in and gather any equipment that they needed.

All 125 sixth grade students were invited to participate in the study. This was done by making announcements about participation in the study for several days before the study started. Finally, a letter was sent home with each of the students (Appendix B). The letter contained information about the purpose of the study and details about the time and location of an informational meeting about the research. In order to help ensure that parents received the letter students were awarded points in class if they brought back a slip of paper signed by the parent / guardian stating that the letter was received. There was a meeting where the researcher gave information about the study and showed parents and students the heart rate monitors. At the informational session parents and students had the opportunity to ask questions and sign an informed consent document (Appendix C). Each parent was given a copy of the informed consent document.

Data was collected over a period of six days. On the first day of data collection the participants, along with all other students enrolled in sixth grade physical education, completed the 1 mile endurance run / walk test. The finish time of every student was

recorded. The results of this test were compared to the percentile rank for the appropriate age and gender on the Presidents Fitness test normative data. For the purpose of this study a participant whose time ranked in the 65th percentile or higher was classified as a high fitness level. An average fitness level was categorized as a score between the 65th percentile and 35th percentile. A low cardiovascular fitness level was a score that was lower than the 35th percentile. The purpose of this assessment of cardiovascular fitness was to determine if the cardiovascular fitness levels of students had an impact on the amount of time the students spent in or above the target heart rate zone.

For the next five academic days students who volunteered to participate in the study wore Vantage XL Polar heart rate monitors. As the students entered the gym they were given chest straps to put on when they were changing clothes. The wrist band was placed on their left wrist when each participant exited from the locker room. After the watches were set to record data, a piece of masking tape was put over the face of the watch to cover the screen. The sound was also turned off on all of the watches. Data was recorded for the entire activity period at five second intervals. At the end of class, chest straps and wrist watches were collected by the instructor. Since there was only three minutes of passing time between each class, data was not downloaded from the watches until after school. Each watch can store eight individual files. Only three of the watches were used by more than one student throughout the school day. Between each class the transmitters were cleaned and dried. Clean elastic bands for the chest transmitters were ready for the next class. At the end of the day the data was downloaded from the watches to an Acer computer owned by the researcher.

The lesson plan for each day of the study is included in Appendix D. There were two days of team sports (basketball, soccer). There were two days of aerobics (Tae-Bo, circuit training), and one day of student choice activity. On the student choice day, participants could choose between walking, jumping rope, basketball, volleyball, and/or a running game.

Data Analysis

The appropriate level of physical activity was determined by using the percentage of age-predicted maximal heart rate method (Powers & Howley, 2004, p. 314). The average age of participants in this study was 12 years old. Using the accepted method of $220 - \text{age}$, the average heart rate maximum for this study was 208 BPM. Therefore using the percentage of maximal heart rate method, the number 208 was multiplied by 70% to determine the minimum heart rate. By using this method the minimum heart rate for this study was set at 146 BPM. The desired heart rate range for this study (146 BPM and higher) was referred to as the target heart rate zone.

All of the null hypotheses were evaluated using ANOVA tests. The statistical test results can be found in Appendix E. Since there were two days of data collection for both team sports and aerobics, an average of the two days for each participant was calculated. That average for team sports and also for aerobics was used to complete the ANOVA tests. Since there was only one day of a student choice class the average did not need to be calculated for that category before the ANOVA tests were completed. ANOVA tests were computed to test the following hypotheses: The first null hypothesis was that there would not be any difference in the time spent in the target heart rate zone in the three different types of physical education classes (team sports, aerobics, student choice). The second null hypothesis stated during completion of the team sports classes there would not be a

difference in the percentage of time spent in the target heart rate zone for the three fitness levels (high, average, low). The next null hypothesis was that there would be no difference in the percentage of time spent in the target heart rate zone for the three fitness levels during the aerobics classes. Another null hypothesis for this study was that there would be no difference in the percentage of time spent in the target heart rate zone for the three fitness levels during the student choice class. The next null hypothesis was there would be no difference in the percentage of time spent in the target heart rate zone for high fitness students in the three classes (team sports, aerobics, student choice). The next null hypothesis for this study stated that there was no difference in the percentage of time spent in the target heart rate zone for average fitness students in the three classes (team sports, aerobics, student choice). The last null hypothesis was that there would be no difference in the percentage of time spent in the target heart rate zone for low fitness students in the three different classes (team sports, aerobics, student choice).

All of the statistical tests were computed using a TI-86 calculator and an ACER laptop computer with Microsoft Excel. The ANOVA tests were completed using the procedures found in the Thomas and Nielsen text (2001, p 147-151).

When all of the data collection was completed, an ANOVA statistical test with a confidence level of $p < 0.05$ was used to assess the effectiveness of team sports classes versus aerobics classes versus student choice activities to achieve heart rates in or above target heart rate zone. The current cardiovascular fitness level of students was also evaluated to determine if it had an impact on activity levels in the three different types of physical education classes.

The first statistical test that was completed looked at the time in target heart rate zone for all participants to determine if there was one type of activity that allowed students to spend a larger percentage of time in the target heart rate zone. The next three ANOVA tests that were completed evaluated each fitness level separately to determine if there was one type of class activity that was more beneficial to a particular fitness level. The last three ANOVA tests looked at each type of activity, team sports, aerobics, and student choice for all three fitness levels separately to determine if one fitness type was more successful staying in the target heart rate in a particular activity.

After the data was analyzed and class summary reports had been prepared, a report was prepared for the students, parents, and administrators to review. Class summary reports for each type of activity can be found in Appendix F. Confidentiality of each participant was protected by reporting group information and not individual results. However, every student was given a folder that contained a printout of his / her heart rate from each class session completed and recorded successfully. The folder also contained a detailed summary report of that student's activity prepared using the Polar E series software. Samples of individual heart rate reports can be found in Appendix G.

Chapter 4

RESULTS

Introduction

Data was collected from seventeen participants during the study. One of the participants who volunteered to participate in the study did not attend school during the data collection period. The average percentage of time spent at or above the target heart rate zone for all participants regardless of fitness level was above fifty percent for two of the three types of physical education classes. The participants in the study also had an average time above the twenty minute recommendation made by the ACSM, regardless of fitness level, in all three types of classes. The high fitness students met the goal of being at or above the target heart rate zone for at least 50% of total class time in all three types of classes (aerobics, student choice, and team sports). The average fitness level students were able to meet that goal in two of the three types of classes, but the low fitness students were only able to meet the goal in one of the three types of classes.

First Research Question

The first research question asked which physical education class, aerobics, team sports or student choice activities resulted in sixth grade students spending the largest percentage of class time in the target heart rate zone (146 BPM or higher). The research hypothesis was that one type of physical education class (team sports, aerobics, or student choice) would allow students to spend a higher percentage of time in the target heart rate zone.

Table 2 shows the percentage of time students spent in the target heart rate zone during each day of data collection. There is also a brief explanation given in the table if the

data was not collected for a student on a particular day of the study. There were five times that data was not collected during the study due to a participant being absent. There was one session that data was not collected because it was not recorded properly. The highest percentage of time spent in the target heart rate zone was 90.4% of the time. The participant was a female student who was classified as high fitness and the type of class she was in was an aerobics class. The lowest percentage of time in the target heart rate zone recorded during this study was 10.7%. The participant who completed that session was classified as having an average cardiovascular fitness level. The participant was completing an aerobics class when that heart rate data was collected.

Table 2
Percentage of time in the target heart rate zone

Student ID	Fitness Level	Gender	Age	Team Sport #1	Team Sport #2	Aerobics #1	Aerobics #2	Student Choice
8	High	Female	12	78.20%	82.00%	87.20%	90.40%	70.70%
10	Average	Male	12	48.90%	49.50%	39.20%	32.20%	51.50%
15	High	Male	11	79.20%	85.80%	83.70%	ABSENT	68.20%
16	High	Female	12	71.30%	29.40%	11.20%	52.30%	24.90%
19	Average	Female	11	74.00%	81.40%	67.10%	35.60%	75.80%
21	Low	Male	13	68.80%	53.80%	17.10%	75.00%	20.40%
29	Average	Male	12	57.40%	65.60%	10.70%	44.80%	40.20%
30	Low	Male	12	60.90%	ABSENT	55.00%	ABSENT	33.60%
31	Low	Male	11	55.10%	78.00%	13.50%	22.70%	52.90%
41	High	Male	11	64.90%	75.00%	29.40%	46.30%	20.40%
44	Average	Female	11	66.40%	63.80%	47.00%	40.55%	42.30%
52	High	Male	12	78.10%	80.40%	45.80%	ABSENT	87.70%
53	Average	Male	12	64.90%	79.40%	86.90%	81.10%	66.50%
63	Average	Female	11	59.50%	62.70%	80.90%	30.70%	56.60%
78	Average	Male	11	73.40%	72.50%	24.60%	40.60%	DATA NOT RECORDED
84	High	Female	12	ABSENT	72.00%	88.10%	66.10%	77.10%
87	Low	Male	12	45.70%	68.70%	15.40%	34.10%	34.90%

The mean percentage of time spent in the target heart rate for all participants in team sports was $67.08 \pm 12.59\%$ (mean \pm standard deviation). For all aerobics sessions the mean was $48.23 \pm 25.81\%$. The mean percentage of time spent in the target heart rate during the

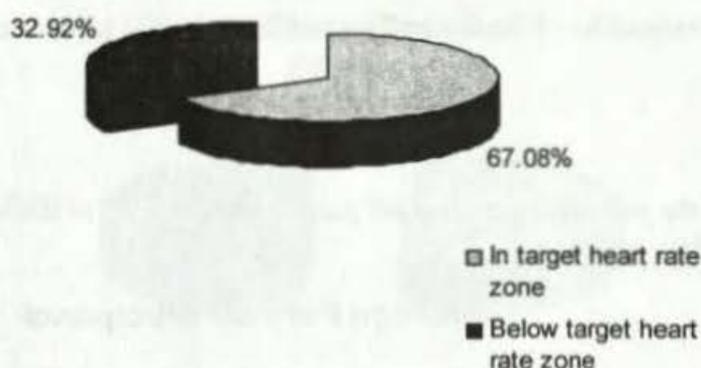
student choice activity was $51.48 \pm 21.45\%$. The results of the simple ANOVA test were not significant, $F(2,47) = 0.0073$, $p > 0.05$, in how much time students spent in the target heart rate in aerobics, team sports, or student choice activities. Two of the three activities resulted in students exceeding the goal set by the United States Department of Health and Human Services in the Healthy People 2010 recommendations. The goal was for students to spend at least 50% of class time being physically active. The two activities that met the goal were team sports and student choice. However, aerobics was close to the goal at $48.23 \pm 25.81\%$.

During both basketball and soccer classes (team sports) the average session lasted 45 minutes and 14 seconds. The average time spent below the target heart rate zone was 14 minutes and 51 seconds or 32.9% of class time. The students' average time spent in the target heart rate was 30:08 (minutes: seconds). The high cardiovascular fitness level students spent on average 32:57 in the target heart rate for both sessions of team sports. The average fitness students spent 28:59 in the target heart rate zone. The low fitness students spent an average of 28:31 in the target heart rate. As stated earlier, the mean percentage of time spent in the target heart rate for all participants in team sports was $67.08 \pm 12.59\%$ for all participants regardless of fitness level. Figure 1 represents the mean percentage of time all participants were in the target heart rate zone during the team sports activities.

Figure 1

The mean of the percentage of time all participants were at or above the target heart rate zone in team sports activities.

Team Sports For All Participants



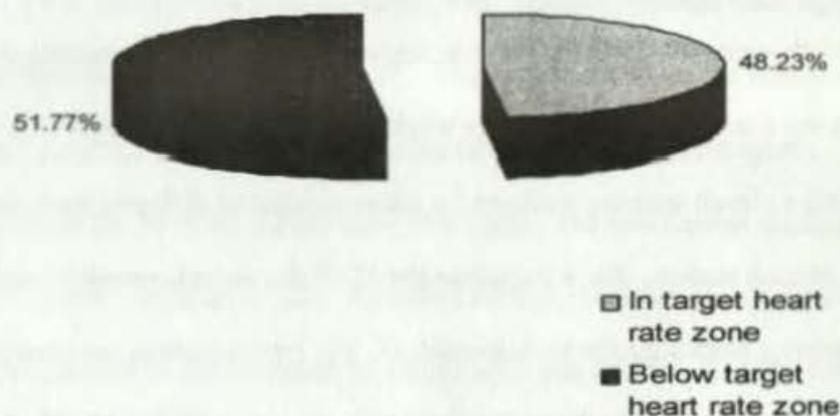
There were two types of aerobic activities for students to participate in. The two activities were completing a Tae – Bo workout by following along with a video, and completing a circuit training workout by going around to different stations and doing the workout at each station. For a complete list of all the exercise stations completed during the circuit training workout refer to Appendix D. For both aerobics sessions the mean percentage of time spent in the target heart rate zone was $48.23 \pm 25.81\%$ for all participants regardless of fitness level. The average time spent below the target heart rate zone was 21:46 (minutes: seconds). The average session for all participants lasted 42:41. The average amount of time spent in the target heart rate was 20:53. The low fitness students averaged 13:49 in the target heart rate zone for both sessions. During the Tae – Bo session for low fitness students the time in the target heart rate zone was only 6:35, while the time in the target heart rate zone for circuit training was 21:03. The average fitness students spent 21:19 in the target heart rate zone during both lessons. The average time in the target heart rate zone for the average fitness students was 22:42 for Tae-Bo, and for circuit training the

average time in the target heart rate zone was 19:56. The high fitness students spent 26:35 in the target heart rate zone during both the aerobic classes. The average time spent in the target heart rate zone during Tae-Bo for the high fitness students was 21:52 and for circuit training it was 31:18. The pie graph in Figure 2 illustrates the mean percentage of time all participants, regardless of fitness level, spent in the target heart rate zone during both aerobic sessions.

Figure 2

The mean of the percentage of time all participants were at or above the target heart rate zone in aerobics activities.

Aerobics For All Participants

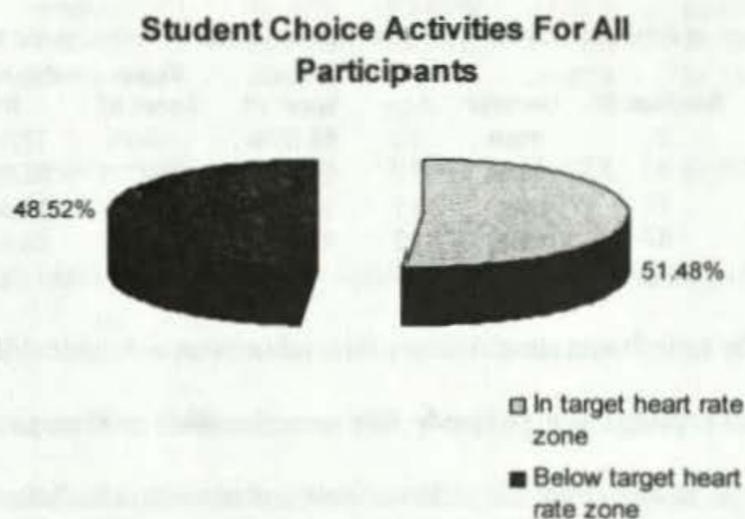


There was only one class period devoted to student choice activities during the data collection. The average amount of time spent in the target heart rate zone was 24:14 (minutes: seconds) for all participants. Figure 3 shows a pie graph that represents the mean percentage of time all participants were in the target heart rate zone. The time spent below that level for all participants was 21:49. The average activity time for all participants was 46:13. The students classified as average fitness level spent 26:45 in the target heart rate zone. The high fitness level students spent 26:02 in the target heart rate zone. The low fitness students spent 15:18 in the target heart rate zone on average during the student choice

activities. The mean percentage of time spent in the target heart rate zone during the student choice activity was $51.48 \pm 21.45\%$ for all participants regardless of fitness level.

Figure 3

The mean of the percentage of time all participants were at or above the target heart rate zone in student choice activities.



Second Research Question

A secondary research question asks whether or not current cardiovascular fitness levels impact the amount of time students spent in the target heart rate in the three different types of classes. There were four low fitness students in the study. All four low fitness students were male. Participants that were classified as low cardiovascular fitness successfully completed seven team sports classes, seven aerobics classes, and four student choice classes. The individual results for all of the low fitness participants can be found in Table 3. The mean percentage of time the low fitness students spent in the target heart rate zone for the three different activities was $61.57 \pm 11.01\%$ for team sports, $33.25 \pm 23.44\%$ for aerobics, and for student choice activities $35.45 \pm 13.35\%$. The results of the simple ANOVA test were not significant, $F(2,9) = 0.5164$, $p > 0.05$, in how much time participants with a current low cardiovascular fitness level spent in the target heart rate in aerobics, team sports,

or student choice activities. For this group of low cardiovascular fitness students there was no statistically significant difference in the amount of time spent in the target heart rate zone in the three different types of physical education classes that they participated in.

Table 3

Percentage of time low cardiovascular fitness students were in the target heart rate zone.

Fitness Level	Student ID	Gender	Age	Team Sport #1	Team Sport #2	Aerobics #1	Aerobics #2	Student Choice
Low	21	male	13	68.80%	53.80%	17.10%	75.00%	20.40%
Low	30	male	12	60.90%	ABSENT	55.00%	ABSENT	33.60%
Low	31	male	11	55.10%	78.00%	13.50%	22.70%	52.90%
Low	87	male	12	45.70%	68.70%	15.40%	34.10%	34.90%

The next fitness classification for students was average cardiovascular fitness. There were seven participants in the study that were classified as average cardiovascular fitness based on the results of the one mile endurance run/ walk test. Four of the students were male and three were female. The average cardiovascular fitness students completed fourteen team sports classes, fourteen aerobic classes, and six student choice classes. The individual results of each average fitness level participant can be found in Table 4. The team sports classes and aerobics classes were offered on two separate occasions but there was only one day of student choice activities offered. The mean percentage of time spent in the target heart rate zone for team sports was $65.67 \pm 9.09\%$. The mean for aerobics was $47.28 \pm 23.02\%$. The mean percentage of time for the student choice lesson was $55.48 \pm 13.84\%$. The results of the simple ANOVA test were not significant, $F(2,17) = 0.0443$, $p > 0.05$, in how much time average fitness students spent in target heart rate zone in aerobics, team sports, or student choice activities. Two of the three activities allowed average fitness students to meet the goal of spending at least 50% of class time in the target heart rate zone. The two activities were team sports and student choice.

Table 4

Percentage of time average cardiovascular fitness students were in the target heart rate.

Fitness Level	Student ID	Gender	Age	Team Sport		Aerobics		Student Choice
				Sport #1	Sport #2	#1	#2	
Average	10	male	12	48.90%	49.50%	39.20%	32.20%	51.50%
Average	19	female	11	74.00%	81.40%	67.10%	35.60%	75.80%
Average	29	male	12	57.40%	65.60%	10.70%	44.80%	40.20%
Average	44	female	11	66.40%	63.80%	47.00%	40.55%	42.30%
Average	53	male	12	64.90%	79.40%	86.90%	81.10%	66.50%
Average	63	female	11	59.50%	62.70%	80.90%	30.70%	56.60%
Average	78	male	11	73.40%	72.50%	24.60%	40.60%	DATA DID NOT RECORD

Of the six high cardiovascular fitness participants, three were male and three were female participants. The high fitness students completed eleven team sports classes, nine aerobic classes, and six student choice classes. The percentage of time spent in the target heart rate zone for each participant can be found in Table 5. The mean percentage of time spent in the target heart rate zone was $72.39 \pm 15.36\%$ for the eleven team sports classes. In the aerobics classes the mean was $60.05 \pm 29.10\%$. The mean for the six student choice classes was $58.16 \pm 28.35\%$. The results of the simple ANOVA test were not significant, $F(2,15) = 0.0164, p > 0.05$, in how much time high cardiovascular fitness participants were in the target heart rate zone in aerobics, team sports, or student choice activities. For this group of 6th grade high cardiovascular fitness students there was no statistically significant difference in the percentage of time spent in the three different types of activities. As a group the high fitness students were in the target heart rate zone for 50% or more of class time in all three of the activities.

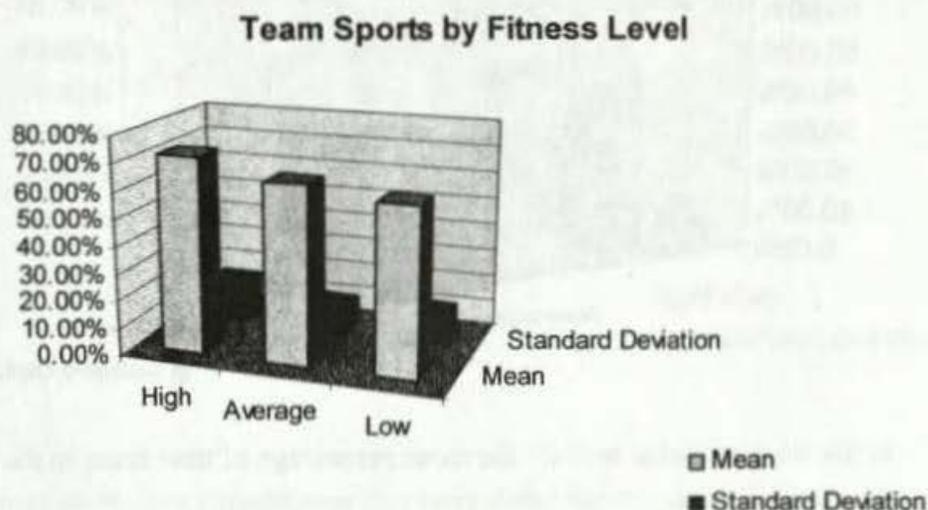
Table 5
Percentage of time high cardiovascular fitness students spent in the target heart rate zone

Fitness Level	Student ID	Gender	Age	Team Sport #1	Team Sport #2	Aerobics #1	Aerobics #2	Student Choice
High	8	female	12	78.20%	82.00%	87.20%	90.40%	70.70%
High	15	male	11	79.20%	85.80%	83.70%	ABSENT	68.20%
High	16	female	12	71.30%	29.40%	11.20%	52.30%	24.90%
High	41	male	11	64.90%	75.00%	29.40%	46.30%	20.40%
High	52	male	12	78.10%	80.40%	45.80%	ABSENT	87.70%
High	84	female	12	ABSENT	72.00%	88.10%	66.10%	77.10%

Another important piece of this study that needed to be looked at is comparing the performance of students with different fitness levels during each type of class. The first type of class that will be reviewed is the team sports classes (basketball and soccer). The low fitness students spent 61.57 ± 11.01 % of time in the target heart rate zone during the team sports classes. The average fitness students spent 65.67 ± 9.9 % of time in the target heart rate zone during the basketball and soccer classes. The high fitness students were in the target heart rate zone for 72.39 ± 15.36 % during both team sport classes. The results of the simple ANOVA test were not significant, $F(2,14) = 0.0338$, $p > 0.05$, in how much time the three different fitness level students spent in the target heart rate zone in team sports. Therefore, the fitness level of the 6th grade participants in this study did not have an impact in how much time was spent in the target heart rate zone while participating in team sports classes. The graph shown in Figure 4 represents the mean percentage of time the three different fitness level groups were in the target heart rate zone during the completion of the two team sports sessions. Even though there was no statistically significant difference there was a trend that can be seen in Figure 4. The high fitness students spent the largest percentage of time in the target heart rate zone. The average fitness students spent the second highest percentage of time in the target heart rate zone, and the low fitness students

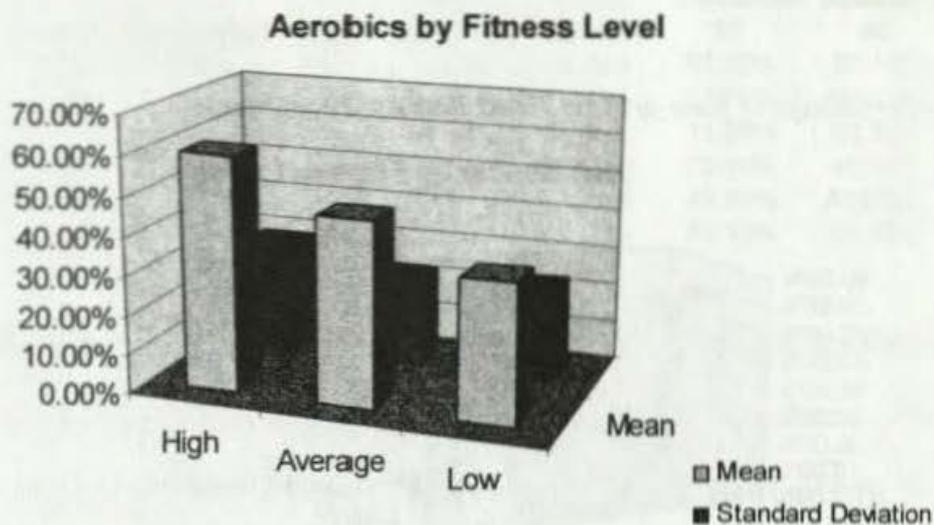
spent the least amount of time in the target heart rate zone, but it was still greater than the recommended 50%.

Figure 4
Mean Percentage of Time in Target Heart Rate for Team Sports



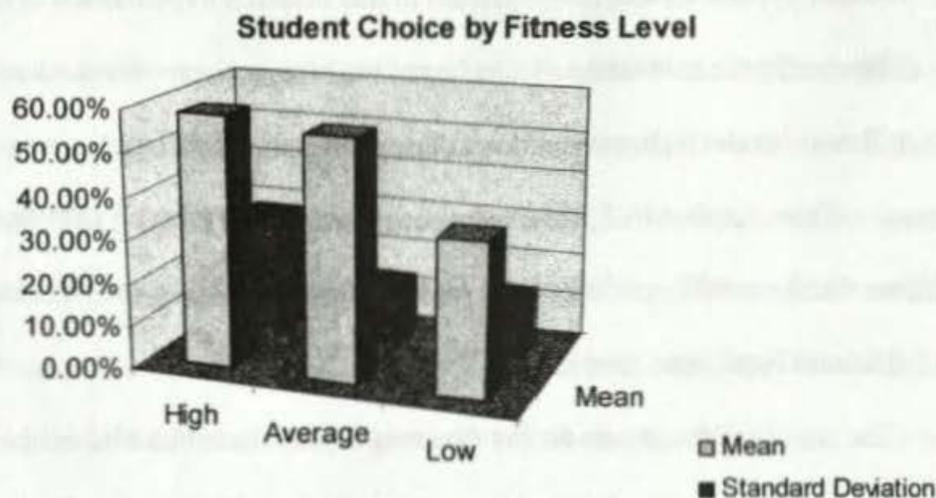
The aerobics classes, Tae-Bo and circuit training, resulted in the students with a low fitness level having a mean percentage of time in the target heart rate zone of $33.25 \pm 23.44\%$ for total class activity time. The average fitness students had a mean percentage of time in the target heart rate zone of $47.28 \pm 23.02\%$ during both types of aerobics classes. The mean percentage of time that the high fitness students were in the target heart rate zone was $60.05 \pm 29.10\%$. Figure 5 is a graph that compares the mean percentage of time and standard deviation of the three different fitness levels spent in the target heart rate during the two aerobic sessions. The results of the simple ANOVA test were not significant, $F(2,14) = 0.0351$, $p > 0.05$, in how much time the three different fitness level students spent in the target heart rate zone in the aerobics classes. Therefore, the fitness level of the 6th grade participants in this study did not have an impact in how much time was spent in the target heart rate zone while participating in the two different types of aerobics classes.

Figure 5
Mean Percentage of Time in the Target Heart Rate for Aerobics



In the student choice activity the mean percentage of time spent in the target heart rate zone for low fitness students was $35.45 \pm 13.35\%$. The average fitness students spent $55.48 \pm 13.84\%$ in the target heart rate zone. The mean percentage of time spent in the target heart rate zone was $58.16 \pm 28.35\%$ for the high fitness students. Figure 6 is a graph that displays the mean percentage of time the three different fitness groups spent in the target heart rate zone during the completion of the one day of student choice activities. The results of the simple ANOVA test were not significant, $F(2,13) = 0.0585$, $p > 0.05$, in how much time the three different fitness level students spent in target heart rate zone while participating in student choice activities. Therefore, the fitness level of the 6th grade participants in this study did not have an impact in how much time was spent in the target heart rate zone while participating in student choice activities.

Figure 6
Mean Percentage of Time in the Target Heart Rate for Student Choice Activities



Summary

There were seven hypotheses that were stated for this research study. The first hypothesis was there would be a difference in the percentage of time spent in the target heart rate zone in the three types of physical education class (team sports, aerobics, or student choice). The corresponding null hypothesis was there would not be a difference in the percentage of time spent in the target heart rate zone in the three different types of physical education classes (team sports, aerobics, or student choice). The first null hypothesis was accepted based on the results of the ANOVA test. The results of the simple ANOVA test were not significant, $F(2,47) = 0.0104$, $p > 0.05$, in how much time students spent in the target heart rate in aerobics, team sports, or student choice activities. There was no statistically significant difference in the percentage of time spent in the target heart rate zone in the three types of physical education classes.

The next three hypotheses all evaluated differences between the three fitness levels within each of the three types of physical education classes. The first of those three hypotheses stated with team sports activities there would be a difference in the percentage of

time spent in the target heart rate zone among the three fitness level groups (high, average, low). The null hypothesis that corresponded to that research hypothesis was that there would be no difference in the percentage of time spent in the target heart rate zone among the three different fitness levels (high, average, low) during the completion of the team sports classes. The results of the simple ANOVA test were not significant, $F(2,14) = 0.0338$, $p > 0.05$, in how much time the three different fitness level students spent in the target heart rate zone in team sports. The null hypothesis was accepted.

The next hypothesis was during the completion of aerobics classes there would be a difference in the percentage of time spent in the target heart rate zone among the three fitness groups (high, average, low). The null hypothesis was there would be no difference in the percentage of time spent in the target heart rate zone among the three fitness levels (high, average, low) during the two aerobics class sessions. Once again the null hypothesis was accepted. The results of the simple ANOVA test were not significant, $F(2,14) = 0.0351$, $p > 0.05$, in how much time the three different fitness level students spent in target heart rate in the aerobics classes.

The last research hypothesis in this section was that there would be a difference in the percentage of time spent in the target heart rate zone between the three different fitness levels (high, average, low) during the completion of the student choice class. The null hypothesis was there would be no difference in the amount of time spent in the target heart rate zone for the three fitness levels (high, average, low) during the student choice class. Based on the results of the statistical test, the null hypothesis was accepted. The results of the simple ANOVA test were not significant, $F(2,13) = 0.0585$, $p > 0.05$, in how much time the three

different fitness level students spent in target heart rate zone while participating in student choice activities.

There were three more research hypotheses for this study. The first of these three hypotheses was completion of the student choice activity would result in the high fitness students spending a higher percentage of time in the target heart rate zone compared to the team sports and aerobics activities. The null hypothesis was there would be no difference in the percentage of time spent in the target heart rate zone for high fitness students in the three types of physical education classes. The results of the simple ANOVA test were not significant, $F(2,15) = 0.0164$, $p > 0.05$, in how much time high cardiovascular fitness participants were in the target heart rate zone in aerobics, team sports, or student choice activities. The statistical tests indicated acceptance of the null hypothesis; there was no difference in the percentage of time spent in the target heart rate zone in the three types of physical education classes for high fitness students.

The next hypothesis was the average fitness students would spend a higher percentage of time in the target heart rate zone during the completion of the team sports class compared to the other two types of classes. The null hypothesis was there would be no difference in the percentage of time spent in the target heart rate zone for average fitness students in the three physical education classes (team sports, aerobics, or student choice). The results of the simple ANOVA test were not significant, $F(2,17) = 0.0443$, $p > 0.05$, in how much time average fitness students spent in target heart rate zone in aerobics, team sports, or student choice activities. There was no statistically significant difference, so the null hypothesis was accepted.

The last hypothesis for this study was the low fitness students would spend a higher percentage of time in the target heart rate zone during the aerobics classes than in the team sports or student choice classes. The null hypothesis was there would be no difference in the percentage of time in the target heart rate zone for low fitness students in the three different classes (team sports, aerobics, students' choice). The results of the simple ANOVA test were not significant, $F(2,9) = 0.5164$, $p > 0.05$, in the percentage of time participants with a low cardiovascular fitness level spent in the target heart rate zone in aerobics, team sports, or student choice activities. The null hypothesis was accepted for low fitness participants because there was no statistically significant difference in the time in the target heart rate zone during the three different activities.

Chapter 5

Discussion

Introduction

The statistical analysis of the current study indicated that there was not one type of activity in which students were in the target heart rate zone for a statistically significant different percentage of time compared to the other activities. With the participants in this research study, both team sports (67.08%) and student choice activity (51.48%) resulted in students spending more than 50% of total class time in the target heart rate zone, regardless of fitness level. The mean percentage of time in the target heart rate zone for all participants in student choice (48.23%) was close to the 50% goal set by Healthy People 2010 (United States Health and Human Services, 2000). However, it is interesting to note that the only type of activity that resulted in the low fitness students being in the target heart rate zone for over 50% of class time was team sports.

Discussion of Results

With all three activities the standard deviation was quite large. With team sports for all participants the standard deviation was 12.59%, for aerobics it was 25.81%, and for student choice the standard deviation was 21.45%. The one class that seemed to provide the most consistent results for all participants was team sports. The standard deviation for all three fitness levels was the lowest during the team sports classes. The team sports classes were also the only type of physical education classes that allowed all three fitness levels to meet or exceed the goal of being physically active for at least 50% of class time. The reason for this remains unclear. However, students in this school have more opportunities to be

involved in team sports than aerobics activities. There is a youth recreation program in this community that allows youth to participate year round in different team sports.

Even though there was no statistically significant difference in the percentage of time spent in the target heart rate zone for the three different fitness levels, there was a trend of increasing time spent in the target heart rate zone with increasing fitness levels. The trend can be seen in all three activities. In team sports the low fitness students were in the target heart rate zone for $61.57 \pm 11.01\%$ of class time, the average fitness students were in the target heart rate zone for $65.67 \pm 9.90\%$, and the high fitness students were in the target heart rate zone for $72.39 \pm 15.36\%$ of class time. During the student choice activity, the low fitness students were in the target heart rate zone for $35.45 \pm 13.35\%$ of class time, the average fitness students were in the target heart rate zone for $55.48 \pm 13.84\%$, and the high fitness students were in the target heart rate zone for $58.16 \pm 28.35\%$. However, the aerobics classes seem to show the biggest differences among fitness levels. The low fitness students were in the target heart rate zone for $33.25 \pm 23.44\%$ during the aerobics sessions, the average fitness students were in the target heart rate zone for $47.28 \pm 23.02\%$, and the high fitness students were in the target heart rate zone $60.05 \pm 29.10\%$ during the completion of both aerobics classes. The students with the highest cardiovascular fitness levels were able to stay in the target heart rate zone for a larger percentage of time than their less fit peers. Even though the difference was not significant statistically, it is an interesting trend that might be worth looking into with further research.

Another factor that should be looked at is a trend concerning the activities that all three fitness level groups were able to meet the goal of being physically active for 50% of class time. The low fitness students only met the 50% goal in one of the three activities they

participated in. That activity was team sports and the percentage was $61.57 \pm 11.01\%$. The average fitness students met the goal of being in the target heart rate zone for two of the three activities. Those two activities were team sports ($65.67 \pm 23.02\%$), and student choice ($55.48 \pm 13.84\%$). The high fitness students were able to meet the goal of being physically active for 50% of class time in all three types of physical education classes. For team sports the percentage was $72.39 \pm 15.36\%$, for aerobics the percentage was $60.05 \pm 29.10\%$, and the percentage of class time in the target heart rate zone was $58.16 \pm 28.35\%$ during the student choice class. This is an important finding because it might indicate that the higher fitness students can meet the Healthy People 2010 goal regardless of the type of physical education classes. In contrast, the students with a lower fitness level might only be able to meet that goal during team sports type classes.

It is interesting to note that only the high fitness students were able to meet the goal of being in the target heart rate zone for 50% of class time during all three activities. The higher fitness level of those students might make it easier for them to work at a higher level than lower fitness students during any type of physical education class. Another possible explanation is that the high fitness students were given more opportunities to participate because of their higher fitness level. However, that explanation does not explain why the high fitness students were spending more time in the target heart rate zone during the Tae-Bo or circuit training classes because those classes were individual activities. All of the participants were able to be in the target heart rate zone during the team sports class. There might be several explanations for this. One possible explanation is that 6th grade students really enjoy participating in group activities that allow them to interact with their peers and be a part of a group. The low fitness students might have been trying harder during the team

sports sessions because of the fact that peers were counting on them to perform at a certain level in order to help the team. Team sports classes were the only activity that low fitness students were able to meet the goal of being physically active for 50% of class time. The average fitness students met that goal during both the team sports classes and the student choice classes. These average fitness students might have also really pushed themselves to meet the expectations of peers during the team sport classes. During the student choice classes the participants might have been participating in an activity that they really enjoyed and were exercising at a higher level because they enjoyed the activity.

Discussion of Procedures and Data Collection

Very few parents attended the informational session to ask questions and sign informed consent forms. There were only nine parents who came to the meeting. All nine parents were willing to sign an informed consent document. The meeting was held on a Friday evening which was not the best time to have such a meeting, but the end of a school year is a very busy time and it was the only evening that did not have another event scheduled. The rest of the parents met with the researcher by making appointments and after an individual meeting the informed consent document was signed. In the future it would be helpful to collect data earlier in the semester. Another possible idea would be to schedule the meeting at the same time as a parent teacher conference since the parents would be at the school already for the conference.

There were eighteen students who agreed with informed parental consent to be a part of the research study. There was data on seventeen students included in the study. One student was not able to be part of the study due to missing every possible class during the data collection period. There was not as much data collected as planned due to both absences

and data not being recorded on the watches correctly. Refer to Table 2 for a complete picture of data collected. A limitation was that there was not adequate time to allow participants to make up missed sessions due to the study being done so close to the end of the academic year. In the future it would be helpful to collect data earlier in the semester to allow participants to complete any make up classes.

Another limitation with this research study was the difficulty getting participants in this age group who were willing to wear heart rate monitors around their chest. The chest strap was even worn by the researcher for one entire day to show participants that it would not interfere with normal activities. Several possible participants were worried about the fact that the chest strap had been worn by somebody else. Even after the cleaning procedures were demonstrated for all possible participants, many students were still uncomfortable with the idea of wearing a chest strap that would be worn by somebody else.

The participants all did a very good job learning how to wear the heart rate monitors. The first day of data collection was not smooth because several participants took a long time to put on the heart rate monitor and they did not adjust it tight enough, so during the warm up portion of the class several participants lost their signal. Once the researcher observed the loss of signal several participants were instructed to tighten the chest strap and data collection began again. Perhaps if a pilot study had been conducted some of the problems on the first day of data collection could have been avoided. The following days of data collection went much smoother. Participants came to class quickly and put on the chest strap and wrist band. Then the participants waited patiently for the instructor to set the watches to record data. Several of the watches were missing buttons and some of the participants even brought their

own paperclip which was used to push the controls on the watches so data collection could begin.

The watches received and recorded the heart rates of the participants at five second intervals. The heart rate data was very useful to the researcher, and at the conclusion of the study the participants and parents were very interested in reviewing the reports of their heart rate during each class session.

Was the effort students gave while wearing the heart rate monitors representative of the effort those students give on a regular basis? The students earn participation points based on their performance in class every day. The students in the research study received similar daily scores during the data collection compared to the week before data collection. So the effort levels during data collection appeared to be very similar to the normal effort levels of those participants. However, it is possible there was a placebo effect that caused the students to complete the classes with a higher intensity level; thus to nullify the placebo effect in future studies, participants should be informed that the data will be collected on random days.

Discussion of Current Study Compared to Literature Review

There were eight different studies reviewed as a part of this research study. The study by Hussey and colleagues (2001), titled "Variability of Physical Activity During Physical Education Lessons Across Elementary School Grades", investigated heart rates during physical education classes in third, fourth, and fifth grade students. The results of that study pointed toward an increase in the amount of time spent in the target heart rate zone each subsequent year of school. In the third grade, those students spent 29.4% of class time in the target heart rate zone. The fourth grade year students spent 35.1% of total class time in

the target heart rate zone. During the fifth grade there was another increase in total time spent in the target heart rate zone, to 42.4% . Thus there was an increase in the percentage of time students spent in the target heart rate zone with an increase in grade level. In the third grade 22% of class time was spent on general knowledge, but in fourth and fifth grade only 14% of class time was devoted to general knowledge. The percentage of time spent in game play was highest in the fifth grade classes. In the fifth grade 34% of class time was spent in game play, but in third and fourth grade only 24% of class time was spent in game play (Levin, et. al., 2001). The students in this current study were in the sixth grade and the percentage of time they spent in the target heart rate zone was 51.48% for student choice activities, 48.23% for aerobics classes, and 67.08% for team sports classes. Two of the types of physical education classes in this study showed an increase from the activity levels reported for fifth grade. The current study shows a higher activity level for the higher grade for two of the three activities which would seem to agree with and build on the findings from the study by Levin et. al. (2001). The study by Louie and Chan (2003) also seems to support the idea that older youth spend more time in the target heart rate zone.

The physical education class in the current study that resulted in students spending the largest percentage of time in the target heart rate zone was team sports. That finding is in agreement with the literature reviewed for this study. The highest percentage of time reported in the literature review was during the completion of a soccer lesson, 65% (Arnett, 2003). The study by Stratton (1997) reported that team sport games (58.5% for netball, 57.8% for soccer, and 45% for European handball) resulted in higher percentage of class time in the target heart rate zone compared to gymnastics (26.83%), dance (9.6%), or fitness (20.5%). These findings agree with the findings of the current study that team sports

activities allow participants to spend higher percentages of class time in the target heart rate zone than student choice or aerobics. For all participants, regardless of fitness level, the time in the target heart rate zone for the current study was $67.08 \pm 12.59\%$ for team sports. The time in the target heart rate zone for the current study was $48.23 \pm 25.81\%$ for aerobics and $51.48 \pm 21.45\%$ for student choice.

The results of the Louie & Chan (2003) study reported students were in the low to moderate activity level during student choice play. With the observational tool that was used in the preschool study, students could be ranked on a scale of one to five. One was resting and five was considered high or very strenuous activity. The majority of students in this study were classified as being in activity level two or three. The results of the current study involving sixth grade students report the mean percentage of time in the target heart rate zone to be 51.48% for all participants during the student choice class. A direct comparison between activity levels in the two studies can't be made because the assessment tools were different (heart rate monitors in the current study compared to observational methods in the Louie and Chan study). In the Louie and Chan (2003) study, the activity level of the preschool students on average was classified as walk/running and climbing. In the current study the students chose from the following activities: volleyball, basketball, jump ropes, tag or running games, and walking. It would be interesting to see future research that looked at activity levels during student choice play at different age levels.

The two studies that evaluated the effectiveness of small sided sports based activities were the only two studies located that compared time spent in the target heart rate zone to fitness levels of participants (Arnett, 2001 and Arnett & Lutz, 2003). The results of those studies found no statistically significant difference between time in the target heart rate zone

and fitness levels but one of the studies pointed to a trend (Arnett & Lutz, 2003). The trend in the study was low fitness student spent 51% of class time being physically active, intermediate fitness students spent 55% of class time being physically active, and high fitness students spent 62% of class time being physically active (Arnett & Lutz, 2003). That trend is similar to the trend found in the team sports classes in the current study. The high fitness students were in the target heart rate zone for 72.39% of class time, the average fitness students were in the zone for 65.67% of class time, and the low fitness students were in the zone for 61.57% of class time during the team sports classes. A follow up study with a larger sample size might provide more insight into whether or not the trend found in both of these studies is meaningful.

Recommendations

There are several recommendations for future research raised as a result of this study. In the future a longer data collection period would be helpful. It would also be a good idea to increase the number of participants in future studies. If students were wearing the heart rate monitors for an entire nine week grading period it would help correct several problems in the study. Student absenteeism would not have an impact on the research if there was adequate time to allow for make up sessions. The participants would have time to become more comfortable wearing the heart rate monitors and there would be less of a concern about the wearing of the monitors affecting performance.

There are several future studies that could be done to help expand and clarify some of the findings from this study. A possible study could be to group students by fitness level into separate classes and have the separate classes all participate in the same lesson design to determine if the students would spend different percentages of time in the target heart rate

zone when working with peers of the same ability compared to working in a group of different ability levels. A study that focused on determining what types of classes low fitness students can meet the goal of being active for at least 50% of class time might be a worthwhile area of research since the low fitness students in this study only met the goal during the team sports classes. Another recommendation would be to conduct another study on a similar population using several different lesson designs to help understand the impact that lesson design has on the time spent in the target heart rate zone.

Summary

In the literature reviewed for this study the amount of time spent in the target heart rate zone ranged from 0.6% to 65% of class time (Arnett, 2001; Arnett & Lutz, 2003; Keating, 1999; Levin, McKenzie, Hussey, Kelder, & Lytle, 2001; Louie & Chan, 2003; Quinn & Strand, 1995; Scantling & Dungdale, 1998; Stratton, 1997). In the current study, the low cardiovascular fitness level students averaged $61.57 \pm 11.01\%$ in team sports classes, $33.25 \pm 23.44\%$ in aerobics classes, and $35.45 \pm 13.35\%$ in student choice activities. Only one of the three physical education classes in the current study allowed low fitness participants to meet the physical activity goals of Healthy People 2010. The students who had an average fitness level spent $65.67 \pm 9.90\%$ of time in the target heart rate zone for team sports, $47.28 \pm 23.02\%$ of time in the target heart rate zone for aerobics, and $55.48 \pm 13.84\%$ of time in the target heart rate zone for student choice activities. The high fitness group of students averaged $72.39 \pm 15.36\%$ of class time in the target zone for team sports, $60.05 \pm 29.10\%$ of class time in the target zone for aerobics, and $58.16 \pm 28.35\%$ of time in the target zone for student choice activities.

Based on the results of this research study, sixth grade students attending La Junta Middle School appear to be meeting the Healthy People 2010 objective that calls for students to be physically active for at least fifty percent of the physical education class during team sports classes. The average and high fitness level students are also meeting that goal during the student choice class. Only the high fitness level students were able to meet the goal during the aerobics classes. However, the average number of minutes in the target heart rate zone for all participants in the three types of classes was over twenty minutes which was the recommendation made by the American College of Sports Medicine (1995). The average time in the target heart rate zone for team sports was 30:08, aerobics was 20:53, and student choice was 24:14. This finding indicates that students enrolled in 6th grade physical education at La Junta Middle School are able to meet the minimum time (20 minutes) necessary to improve fitness recommended by the American College of Sports Medicine. That is a promising finding in this study given the current state of declining health and activity levels of the youth in the United States.

The percentage of class time spent in the target heart rate zone during the current study was at the high end of the percentages reported in the literature review. As previously stated the percentages of time spent in the target heart rate zone in the studies reviewed ranged from 0.64% to 65% (Arnett, 2001; Arnett & Lutz, 2003; Keating, 1999; Levin et. al, 2001; Louie & Chan, 2003; Quinn & Strand, 1995; Scantling & Dungdale, 1998; and Stratton, 1997). One possible reason for the high percentage of time spent in the target heart rate zone could be the design of the lessons used in this study, but without seeing the lessons designs for the other studies it is hard to know. More research is needed to try to determine why the results of this study were closer to the higher end of literature reviewed.

References

- American College of Sports Medicine (1995). *ACSM's Guidelines for Exercise Testing and Prescription* (5th edition), Boston, MA: Williams and Wilkins.
- Arnett, M. (2001). The effect of sport-based physical education lessons on physical activity. *The Physical Educator*, 58 (3), 158-168.
- Arnett, M. & Lutz, R. (2003). Measurement of moderate to vigorous physical activity of middle school girls using tri trac activity monitors during small – sided, game based lessons. *Measurement in Physical Education and Exercise Science*, 7(3), 149-159.
- Crute, S. (2005). Growing pains. *National Education Association Today*, 3, 22-31.
- Keating, D. (1999). Measuring teaching behaviors, lesson context, and physical activity in school physical education programs: comparing the SOFIT and C-SOFIT instruments. *Measurement in Physical Education and Exercise Science*, 3(4), 109-367.
- Levin, S., McKenzie, T., Hussey, J., Kelder, S., & Lytle, L. (2001). Variability of physical activity during physical education lessons across elementary school grades. *Measurement in Physical Education and Exercise Science*, 5(4), 207-218.
- Louie, L., & Chan, L. (2003). The use of pedometry to evaluate the physical activity levels among preschool children in Hong Kong. *Early Childhood Development and Care*, 173(1), 97-107.
- Powers, S., & Howley, E. (2004). *Exercise Physiology: Theory and Application to Fitness and Performance* (5th edition). New York, NY: McGraw – Hill.

Presidents Council on Physical Fitness and Sports, Department of Health and

Human Services. (1999). Get Fit! A handbook for youth ages 6-17. Retrieved from Presidents Challenge, April 15, 2005 from <http://www.fitness.gov/> (note, this paper is retrieved from within a large website)

Quinn, P. & Strand, B. (1995). A comparison of two instructional formats on heart rate intensity and skill development. *Physical Educator*, 52(2), 62-69.

Scantling, E., & Dungdale, H., (1998). The effects of two instructional formats on heart rate intensity and skill development of physical education students. *Physical Educator*, 55(3), 138-144.

Schibsted, E. (2006). Fighting for fitness, schools battle an epidemic of childhood obesity – A problem they helped create. *Edutopia*, 1(9), 30-37.

Stratton, G. (1997). children's heart rates during British physical education lessons. *Journal of Teaching in Physical Education*, 16, 357-367.

Thomas, J., & Nelson, J. (2001). *Research Methods in Physical Activity*. Champaign.

IL: Human Kinetics.

U.S. Department of Health and Human Services. (2000). Healthy People 2010, 2nd Ed. *Understanding and Improving Health and Objectives for Improving Health*. Washington D.C: U.S. Government Printing Office.

APPENDICES

APPENDIX A

PERCENTILE RANKS FOR PRESIDENTS FITNESS TEST

ONE-MILE RUN/WALK FOR BOYS

AGE

PERCENTILE	6	7	8	9	10	11	12	13	14	15	16	17+
100	6:18	7:41	6:30	6:50	6:24	6:29	6:03	5:40	4:30	4:42	4:49	4:46
95	8:54	8:31	8:00	7:48	7:10	6:56	6:43	6:25	6:01	5:50	5:40	5:35
90	9:41	5:56	8:28	8:14	7:39	7:17	6:57	6:39	6:13	6:07	5:56	5:57
85	10:15	9:22	8:48	8:31	7:57	7:32	7:11	6:50	6:26	6:20	6:08	6:06
80	10:32	9:43	9:00	8:47	8:08	7:45	7:25	7:00	6:33	6:29	6:18	6:14
75	10:53	10:02	9:23	9:04	8:19	8:00	7:41	7:11	6:45	6:38	6:25	6:23
70	11:17	10:20	9:38	9:12	8:37	8:14	7:56	7:20	6:59	6:48	6:33	6:32
65	11:41	10:34	9:56	9:30	8:59	8:27	8:05	7:29	7:09	6:57	6:44	6:40
60	12:00	10:55	10:15	9:47	9:11	8:45	8:14	7:41	7:19	7:06	6:50	6:50
55	12:20	11:19	10:39	10:07	9:29	9:01	8:25	7:55	7:29	7:16	6:58	6:57
50	12:36	11:40	11:05	10:30	9:48	9:20	8:40	8:06	7:44	7:30	7:10	7:04
45	13:00	11:56	11:27	10:46	10:10	9:46	8:58	8:17	7:59	7:39	7:20	7:14
40	13:39	12:17	11:55	11:03	10:32	10:07	9:11	8:35	8:13	7:52	7:35	7:24
35	14:11	12:50	12:08	11:20	10:58	10:25	9:40	8:54	8:30	8:08	7:53	7:35
30	14:48	13:23	12:30	11:44	11:14	10:54	10:00	9:10	8:48	8:29	8:09	7:52
25	15:12	13:49	12:54	12:08	11:40	11:25	10:22	9:23	9:10	8:49	8:37	8:06
20	15:34	14:16	13:23	12:33	12:15	12:00	10:52	10:02	9:35	9:05	8:56	8:25
15	16:30	15:00	14:10	12:59	13:07	12:29	11:30	10:39	10:18	9:34	9:22	8:56
10	17:25	16:12	14:57	13:52	13:50	13:08	12:11	11:43	11:22	10:10	10:17	9:23
5	18:12	17:43	16:08	15:01	14:47	14:35	13:14	12:47	12:11	11:25	11:49	10:15
0	22:05	21:20	22:40	19:40	23:00	23:32	23:05	24:12	18:10	21:44	20:15	16:49

ONE MILE RUN-WALK FOR GIRLS

PERCENTILE	AGE											
	6	7	8	9	10	11	12	13	14	15	16	17
100	8:36	8:04	8:00	6:11	6:26	7:07	6:22	5:42	5:00	5:51	5:58	6:20
95	10:06	9:30	9:10	8:21	8:07	8:06	7:35	7:21	7:20	7:25	7:26	7:22
90	10:29	10:05	9:45	9:07	8:49	8:40	8:00	7:49	7:43	7:52	7:55	7:58
85	11:20	10:36	10:02	9:30	9:19	9:02	8:23	8:13	7:59	8:08	8:23	8:15
80	11:37	10:55	10:20	10:03	9:38	9:22	8:52	8:29	8:20	8:24	8:39	8:34
75	12:00	11:17	10:55	10:22	10:08	9:44	9:15	8:49	8:36	8:40	8:50	8:52
70	12:12	11:25	11:20	10:45	10:19	10:04	9:36	9:09	8:50	8:55	9:11	9:15
65	12:20	11:45	11:38	10:58	10:42	10:24	10:05	9:30	9:09	9:09	9:25	9:33
60	12:31	12:20	11:53	11:13	10:52	10:42	10:26	9:50	9:27	9:23	9:48	9:51
55	12:45	12:39	12:10	11:32	11:00	11:00	10:44	10:07	9:51	9:37	10:09	10:08
50	13:12	12:56	12:30	11:52	11:22	11:17	11:05	10:23	10:06	9:58	10:31	10:22
45	13:56	13:21	12:46	12:13	11:40	11:36	11:23	10:57	10:25	10:18	10:58	10:48
40	14:14	13:44	13:07	12:24	11:58	12:00	11:47	11:20	10:51	10:40	11:15	11:05
35	14:45	14:04	13:31	12:48	12:08	12:21	12:01	11:40	11:10	11:00	11:44	11:20
30	15:09	14:32	13:56	13:19	12:30	12:42	12:24	12:00	11:36	11:20	12:08	12:00
25	15:27	14:55	14:21	13:44	13:00	13:09	12:46	12:29	11:52	11:48	12:42	12:11
20	16:10	15:12	14:53	14:07	13:29	13:44	13:35	13:01	12:18	12:19	13:23	12:40
15	16:45	16:00	15:19	14:57	14:00	14:16	14:12	14:10	12:56	13:33	14:16	13:03
10	17:36	16:35	15:45	15:40	14:30	14:44	14:39	14:49	14:10	14:13	16:03	14:01
5	19:00	17:27	16:55	16:58	15:43	16:07	16:00	16:10	15:44	15:17	18:00	15:14
0	21:40	22:19	20:40	24:00	24:00	21:02	24:54	20:45	20:04	24:07	21:00	28:50

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APPENDIX B

LETTER TO PARENTS ABOUT INFORMED CONSENT MEETING

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Message to all 6th grade students and parents**From: Mrs. Martinez**

I am conducting a research study that is designed to see if students are spending enough time in their target heart rate zone during the physical education classes. This is an important study because the United States government has set objectives that state students should be at or above 60% of their maximum heart rate for at least half of the class time.

The physical education class will be the same as it has been all year. Students who participate in the study will be asked to wear a heart rate monitor around their chest and a watch on their left wrist that will collect data during the class.

Your student will not be identified by name in the study. Each participant will be assigned a random number that will be used to identify them. The confidentiality of each participant will be further protected by keeping the informed consent papers locked up in a separate location from the data that is collected in the study.

I hope you will consider letting your student be a part of this research project. I will have a meeting to answer any questions and let parents and students sign the informed consent.

Parents and students will have to attend an informational meeting in order for students to participate in the research project. The meeting will be held on April 28, 2006 at 6:00 PM in the gymnasium. If you are unable to attend this meeting and are still interested in participating in the research project please contact me at the school by April 28, 2006 to set up an alternate meeting time.

Thank You,

Sandra Martinez
Physical Education / Health Instructor

APPENDIX C

INFORMED CONSENT

1. Sandra Martinez, a graduate student in the Department of Exercise Physiology & Leisure Science (EPLS), in the Health and Physical Education (HPE) program at Adams State College, has requested my minor child's (wards) participation in a research study at La Junta Middle School. The title of the research is Physical Activity Levels Associated with Physical Education Classes.
2. I have been informed that the purpose of the research is to investigate the activity levels of middle school students using heart rate monitors and to compare the activity levels in a team sports class to activity levels in an aerobics class. The levels of physical activity within each age group and gender will be studied as well.
3. My child's (ward's) participation will involve completing the Presidential Council on Physical Fitness endurance run test. My child's (ward's) participation will also involve participating in five physical education classes while wearing a heart rate monitor.
4. My child's (ward's) participation will also involve wearing a transmitter that is worn around the chest and a wrist receiver that is worn on the wrist.
5. I understand that there are foreseeable risks or discomforts to my child (ward) if I agree to allow them to participate in this study. Possible discomforts include any injuries that could normally occur during a physical activity class at the middle school.
6. There are no feasible alternative procedures available for this study.
7. I understand that the possible benefits of my child's (ward's) participation in this study include a greater understanding of the physical activity levels of middle school students in La Junta, Colorado.

8. I understand that the results of the research may be published but that my child's (ward's) name or identity will not be revealed. In order to maintain confidentiality of my child's (ward's) record's Sandra Martinez will keep all information from this study in a locked location. Furthermore all informed consent and any other documents with names will be kept separate from the data collected for this study.
9. I understand that in case of injury I can expect the following treatment or care to be provided at my expense. First aid treatment will be provided by licensed school staff following the guidelines of the school and I will be notified of all treatment received by the middle school staff. If my child needs to be transported to an emergency room or hospital I will be contacted at the numbers I provided to La Junta Middle School.
10. I have been informed that I will not be compensated for my child's (ward's) participation.
11. I have been informed that any questions I have concerning the research study or my child's (ward's) participation in it, before or after my consent, will be answered by Sandra Martinez, Department of Physical Education, La Junta Middle School, 901 Smithland Avenue, La Junta Colorado, 81050, 719-384-4371, smartinez@lajunta.k12.co.us.
12. I understand that in case of injury, if I have questions about my child's (ward's), as a participant in this research, or if I feel that my child (ward) has been placed at risk, I can contact the Chair of Human Subjects Research Review Committee at Adams State College, Alamosa Colorado.
13. I have read the above information. The nature, demands, risks, and benefits of the project have been explained to me. I knowingly assume the risks involved and

understand that I may withdraw my consent and discontinue participation of my child (ward) at any time without penalty or loss of benefit to myself, or my child (ward). In signing this consent form, I am not waiving any legal claims, rights, or remedies. A copy of this consent form will be given to me.

Parent's Signature _____ Date _____

14. I certify that I have explained to the above individual the nature and purpose, the potential benefits, and possible risks associated with participation in this research study, have answered any questions that have been raised, and have witnessed the above signature.

15. These elements of informed consent conform to the Assurance given by Adams State College to the EPLS department to protect the rights of human subjects.

16. I have provided the participant's guardian a copy of this signed consent document.

Signature of researcher _____ Date _____

Lesson Plans

Faint, illegible text at the top of the page, possibly containing a table or list of lesson plan details.

APPENDIX D

LESSON PLANS

Main body of faint, illegible text, likely containing the detailed lesson plans mentioned in the header.

Lesson Plan

Unit Title Heart Rate TestingLesson Title Team Sports (Soccer)Pupil group SecondaryNumber in class 25 - 40Instructor Coach MartinezDay #1

Standards

STANDARD 1: Students demonstrate competent skills in variety of physical activities and sports.

- combining skills to competently participate in a variety of individual*, team* and dual* sports (e.g., soccer, softball, tennis, track and field, team handball, field hockey and tumbling);

STANDARD 2: Students demonstrate competency in physical fitness.

- participating in a variety of aerobic and anaerobic activities to attain cardiovascular endurance;
- demonstrating correct techniques for increasing and maintaining flexibility;
- demonstrating correct techniques for warming up and cooling down prior to and following aerobic and anaerobic exercise

Objectives

Performance Goals

Students will

Use their foot to trap the ball when an opponent is dribbling with it—a straight-on tackle;

Perform a body trap; and develop the skill of trapping for air and ground balls.

Review passing the ball using the instep and top of foot.

Review dribbling skills

Cognitive Goals

Students will

Learn that there are many ways to advance the ball

Learn that trapping involves giving with the ball like a cushion not a brick wall.

Motivation

There are a few skills that the students absolutely need to play a soccer game: They have to be able to move the ball forward—they did this one way when they practiced the dribble. They also have to get it in order to move it forward. Ask students how they can get the ball from an opponent legally. That is what they are going to find out in this lesson.

Do Now

Be on time for class.

Bring your planner.

Write down the daily information.

Get dressed into PE clothes in four minutes

Equipment

Soccer balls

Cones

Stopwatches

Team list

Content

1. Take attendance
2. Do now procedures
3. Warm up (5 minutes) Jump rope
4. Focus on flexibility (5 minutes)

FOCUS ON FLEXIBILITY	
ARMS	LEGS & LOWER BACK
double rotations forward	standing toe touch
double rotations backwards	standing to the middle
Tricep stretch right and left	Right and left
Shoulder stretch right and left	Lunge right and left
BACK & ABS	Butterfly
Pretzel right and left	seated toe touch
cat stretch	calf stretch

SKILL CUES

1. Align the body with oncoming ball.
2. Focus eyes on the ball.
3. Cushion the ball to get control.
4. Wedge ground balls by lowering the foot on top of the ball but not too hard or the ball will bounce away.
5. Trap air balls by allowing them to hit the chest or thigh and letting the body absorb the force of the impact so the ball does not have much rebound. The ball should drop straight down to the ground after the impact. (Girls are permitted to cross their arms over their chest when doing a chest block.)
6. Use the inside of the lower leg, the inside of both legs, the front of both legs, and the sole of the foot to execute ball traps on the ground.

TEACHING CUES

1. Explain to your students that trapping is used to stop a rolling or bouncing ball.
2. Remind your students as they trap to use the inside, outside, instep, and sole of the foot when trapping along the ground and the thigh and chest when trapping a ball in the air.

ACTIVITIES (30-40 MINUTES)

1. Present the soccer trap, emphasizing the skill and teaching cues. (4-6 minutes)
2. Demonstrate the drill and then give each team a stop watch.

Speed dribble (5 minutes)

Time each student as he or she dribbles around a cone that is thirty feet away. Allow several tries

Quick pass (6 minutes)

In partners, standing at a distance of 30 feet apart, the students must complete as many passes to their partner as possible in three minutes. The ball can never be touched by the hands.

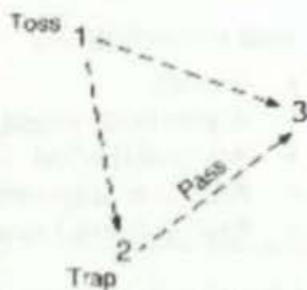
2. Toss and Trap Grounders. (8 minutes) In partners, the first player tosses the ball along the ground for the second player to trap. The first player calls out which foot the partner is to use to trap the soccer ball. After five tosses, the partners change roles.
3. Toss and Trap Air Balls. In groups of four in a square formation, the first player tosses the ball in the air for the second player to trap either with the chest or thigh. After the trap, the second player passes the ball to the third player. The third player picks up the ball and tosses an air ball to the fourth player, who traps the ball and then passes the ball to the first player. The tosses, traps, and passes continue.
4. Circle Trap. (8-10 minutes) Have each team find another team to join up with. A leader for each circle tosses the ball randomly to players, who use an appropriate trap. The choice of trap will depend on the type of toss (on the ground or in the air). The player then passes the ball back to the leader to be tossed to another player. Execute the activity quickly to simulate trapping in a game situation. Blow a whistle every minute to indicate that it is time to change leaders.



Chest trap



Thigh trap



Toss and trap air balls

Mini games

If time allows start several small games with three v three teams.

Assessment

In-Class Daily Expectations (10 Points)
2 Point = Punctuality <ul style="list-style-type: none"> • Reports to the locker room on time • Reports to class on time • Tardiness = minus 1 point -Ex/ tardy to both locker room & class = minus 2 points
2 Point = Appropriate Social Skills <ul style="list-style-type: none"> • Positive interaction • Positive leadership • Appropriate language
1 Point = Safety <ul style="list-style-type: none"> • Proper use of facilities • Proper use of equipment
1 Points = Class Procedures <ul style="list-style-type: none"> • Follows class policies • Follows locker room policies • Has an appropriate change of clothing for class • Follows directions
4 Points = Work Ethics <ul style="list-style-type: none"> • On task • Active involvement • Acceptable effort • Applies concepts and strategies • Applies learned motor skills

CLOSURE (5-8 MINUTES)

Review and discuss with students the content of the lesson. Use the following ideas to reinforce learning, check understanding, and give feedback.

1. Discuss the various types of ground ball traps (inside the lower leg, inside both legs, front of both legs, or sole of the foot).
2. Describe the technique used in trapping an air ball (cushion by giving with the ball, use the thigh or chest).

The activities and objectives in this lesson plan are copied from the book Complete Physical Education Lesson Plans for grades 7 - 12

Lesson Plan

Unit Title Heart Rate Testing
 Pupil group Secondary
 Instructor Coach Martinez

Lesson Title Aerobics (Tae-Bo)
 Number in class 25 - 40
 Day #2

Standards

STANDARD 1: Students demonstrate competent skills in variety of physical activities and sports.

- demonstrating one or more of the following dance or rhythmic activities: folk, square, social, creative, aerobic, modern, jazz, ballet and/or rhythmic activities such as rope jumping, lummi sticks* and tinkling*.

STANDARD 2: Students demonstrate competency in physical fitness.

- participating in a variety of aerobic and anaerobic activities to attain cardiovascular endurance;
- demonstrating correct techniques for increasing and maintaining flexibility;
- demonstrating correct techniques for warming up and cooling down prior to and following aerobic and anaerobic exercise;

STANDARD 3: Students demonstrate the knowledge of factors important to participation in physical activity.

- demonstrating knowledge of complex movement skills used in physical activities;
- identifying the influences of culture, ethnicity and history on dance, low organized and lead-up games, and other physical activities; and
- detecting, analyzing, and correcting errors in personal performance.

Objectives

Improve cardiovascular strength
 Improve coordination
 Improve abdominal and core strength

Do Now

Be on time for class.
 Bring your planner.
 Write down the daily information.
 Get dressed into PE clothes in four minutes.

Equipment

Tae Bo DVD
 Laptop
 Projector
 Speakers
 Screen

Content

5. Take attendance
6. Do now procedure

Start video TAEBO Ultimate ABS

7. Warm up (6 minutes)
 - a. side step with left jab
 - b. jumping jacks
 - c. upper body flexibility exercises
 - d. lower body flexibility exercises
8. Standing abdominal twist exercises (2minutes)
9. Punching bag drill with jab and side step (3 minutes)
10. Standing knee lift (2 minutes)
11. two front punches with a lower body twist (2 minutes)
12. modified jumping jacks (30 seconds)
13. standing crunches (2 minutes)
14. standing oblique crunches (2minutes)
15. Leg lifts to the side (3 minutes)
16. WATER BREAK (4 minutes)
17. Standing -Knee lift to front – knee lift to side (2 minutes)
18. front kick (1 minutes)
19. two forward punches with a knee lift and two steps (2 minutes)
20. forward kicks and transition to forward and back kick (3minutes)
21. knee lift with alternating hand tapping foot (2 minutes)
22. two jabs to the side with a round house kick (1 minute)
23. squats with two punches (1 minute)
24. twist with an upper cut (2 minutes)
25. Side kick (3 minutes)
26. Standing on one leg extend the other knee out to the side (1 minute)
27. Ab rolls standing (1 minutes)
28. Ab crunches with knee extensions (1minute)
29. Ab crunches (1 minute)

Assessment

In-Class Daily Expectations
(10 Points)

2 Point = Punctuality

- Reports to the locker room on time
- Reports to class on time
- Tardiness - minus 1 point

-Ex/ tardy to both locker room & class - minus 2 points

2 Point = Appropriate Social Skills

- Positive interaction
- Positive leadership
- Appropriate language

1 Point = Safety

- Proper use of facilities
- Proper use of equipment

1 Point = Class Procedures

- Follows class policies
- Follows locker room policies
- Has an appropriate change of clothing for class
- Follows directions

4 Points = Work Ethics

- On task
- Active involvement
- Acceptable effort
- Applies concepts and strategies
- Applies learned motor skills

Closure

Talk about what went well in this lesson. Did all students feel that they had enough opportunities to be active in class today?

Unit Title <u>Heart Rate Testing</u> Pupil group <u>Secondary</u> Instructor <u>Coach Martinez</u>	Lesson Plan Lesson Title <u>Basketball</u> Number in class <u>25 - 40</u> Day <u>#3</u>
--	---

Standards

STANDARD 1: Students demonstrate competent skills in variety of physical activities and sports.

- incorporating basic defensive and offensive strategies in modified net games* (*e.g., tennis, volleyball, badminton*) and invasive games* (*e.g., soccer, basketball*);

STANDARD 2: Students demonstrate competency in physical fitness.

- demonstrating correct techniques for increasing and maintaining flexibility;
- demonstrating correct techniques for warming up and cooling down prior to and following aerobic and anaerobic exercise;

STANDARD 3: Students demonstrate the knowledge of factors important to participation in physical activity.

- detecting, analyzing, and correcting errors in personal performance.

Objectives

To review the basics of passing the basketball

To improve cardiovascular fitness

To increase kinesthetic awareness of body position in relation to other people and equipment that is also moving

Do Now

Be on time for class.

Bring your planner.

Write down the daily information.

Get dressed into PE clothes in four minutes.

Equipment

Heart rate monitors

Chest transmitters

List of students participating in study

Basketballs

Court (Inside or Outside)

List of teams

Content

30. Take attendance (2 minutes)
31. Do now procedures (4 minutes)
32. Warm up, line tag (5 minutes)

33. Focus on flexibility (5 minutes)

FOCUS ON FLEXIBILITY	
ARMS	LEGS & LOWER BACK
double rotations forward	standing toe touch
double rotations backwards	standing to the middle
tricep stretch right and left	Right and left
Shoulder stretch right and left	Lunge right and left
BACK & ABS	Butterfly
Pretzel right and left	Seated toe touch
cat stretch	calf stretch

5. Modified Basketball—(15 minutes) Same as regular basketball with exceptions. First, no dribbling, no shooting, and the ball may not touch the floor. Movement of the ball from one end of the court to the other is done by making passes. Ball holder can only pivot when holding the ball and then pass. The object is to movement the ball to either a designated spot for a point, or to the wall, where t is touched for a point. No contact is made by the defender. Variations: Allow dribbling along with passing. Designate a minimum number of passes to be made before a point can be scored.

6. Keep Away—(10 minutes) 4 on a team. The goal is for one team to keep the ball away from their opponents while passing to their teammates. The player with the ball may not walk or dribble with it. The ball may be knocked down or intercepted. The score is determined by the number of completed passes made in succession.

7. Dribble drills—(5 minutes) Every player gets their own basketball and lines up on the endline by the locker. Line up with your teams in the order listed on the board. While you are waiting your turn in line you should be doing jumping jacks

- a. Dribble to half court and back with right hand
- b. Dribble to half court and back with left hand
- c. Dribble to half court while going backwards

8. Ball handling drills—(5 minutes) Serves as a cool down—Every player has their own basketball.

- a. Ball around the waist 10 times
- b. Ball around the head 10 times
- c. Ball around the legs figure eight 10 times
- d. Ball hold—hand switch 10 times

Assessment

In-Class Daily Expectations
(10 Points)
2 Point = Punctuality <ul style="list-style-type: none"> • Reports to the locker room on time • Reports to class on time • Tardiness - minus 1 point -Ex/ tardy to both locker room & class - minus 2 points
2 Point = Appropriate Social Skills <ul style="list-style-type: none"> • Positive interaction • Positive leadership • Appropriate language
1 Point = Safety <ul style="list-style-type: none"> • Proper use of facilities • Proper use of equipment
1 Points = Class Procedures <ul style="list-style-type: none"> • Follows class policies • Follows locker room policies • Has an appropriate change of clothing for class • Follows directions
4 Points = Work Ethics <ul style="list-style-type: none"> • On task • Active involvement • Acceptable effort • Applies concepts and strategies • Applies learned motor skills

Closure

For the students who are wearing a monitor, please hand both the wrist band and chest strap to me before leaving the gymnasium.

Lesson Plan

Unit Title Heart Rate Testing Lesson Title Aerobics (Circuit training)
 Pupil group Secondary Number in class 25 - 40
 Instructor Coach Martinez Day #4

Standards

STANDARD 1: Students demonstrate competent skills in variety of physical activities and sports.

- demonstrating one or more of the following dance or rhythmic activities: folk, square, social, creative, aerobic, modern, jazz, ballet and/or rhythmic activities such as rope jumping, lummi sticks* and tinikling*.

STANDARD 2: Students demonstrate competency in physical fitness.

- participating in a variety of aerobic and anaerobic activities to attain cardiovascular endurance;
- demonstrating correct techniques for increasing and maintaining flexibility;
- demonstrating correct techniques for warming up and cooling down prior to and following aerobic and anaerobic exercise;

Objectives

Improve Cardiovascular strength
 Improve Muscular strength
 Improve flexibility

Do Now

Be on time for class.
 Bring your planner.
 Write down the daily information
 Get dressed in four minutes or less

Equipment

Heart rate monitors
 Chest transmitters
 Signs for circuit stations
 Jump Ropes
 Curl bars
 Moon Jump Balls

Content

34. Take attendance (2 minutes)
35. Do now procedures (4 minutes)
36. Warm up (5 minutes) alternate jogging one lap and walking laps
37. Focus on flexibility (5 minutes)

FOCUS ON FLEXIBILITY	

ARMS	LEGS & LOWER BACK
Double rotations forward	standing toe touch
Double rotations backwards	standing to the middle
Tricep stretch right and left	Right and left
Shoulder stretch right and left	Lunge right and left
BACK & ABS	Butterfly
Pretzel right and left	seated toe touch
cat stretch	calf stretch

38. Explain and demonstrate all of the exercises in the circuit. Then have students pick a partner and a station to start at. Have students move from one station to the next in one minute intervals. Play upbeat music in the background and stop the music when it is time to rotate. After students have been through the stations have them thank their partner and pick a new partner to go through the stations with one more time.

- a. Jumping Jacks
- b. Push ups
- c. Squats
- d. Sit ups
- e. Lunges
- f. Pull ups
- g. Jump ropes
- h. Bicep Curls with the 15 pound bar
- i. Mountain Climbers
- j. Wall Sits
- k. Water break station
- l. Leg lifts
- m. Moon Jump balls

39. Cool down (5 minutes) running laps

40. Repeat flexibility stretches (5 minutes)

Assessment

In-Class Daily Expectations

(10 Points)

<p>2 Point = Punctuality</p> <ul style="list-style-type: none"> • Reports to the locker room on time • Reports to class on time • Tardiness = minus 1 point <p>-Ex/ tardy to both locker room & class = minus 2 points</p>
<p>2 Point = Appropriate Social Skills</p> <ul style="list-style-type: none"> • Positive interaction • Positive leadership • Appropriate language
<p>1 Point = Safety</p> <ul style="list-style-type: none"> • Proper use of facilities • Proper use of equipment
<p>1 Point = Class Procedures</p> <ul style="list-style-type: none"> • Follows class policies • Follows locker room policies • Has an appropriate change of clothing for class • Follows directions
<p>4 Points = Work Ethics</p> <ul style="list-style-type: none"> • On task • Active involvement • Acceptable effort • Applies concepts and strategies • Applies learned motor skills

Closure

Remember to bring appropriate clothes for spring in Colorado. You will need both shorts and sweat pants because we never know what the weather will be like.

Unit Title <u>Heart Rate Testing</u>	Lesson Plan
Pupil group <u>Secondary</u>	Lesson Title <u>Student Choice</u>
Instructor <u>Coach Martinez</u>	Number in class <u>25 - 40</u>
	Day <u>#5</u>

Standards

STANDARD 2: Students demonstrate competency in physical fitness.

- demonstrating correct techniques for increasing and maintaining flexibility;
- demonstrating correct techniques for warming up and cooling down prior to and following aerobic and anaerobic exercise

STANDARD 3: Students demonstrate the knowledge of factors important to participation in physical activity.

- developing and maintaining an individual plan of activity using appropriate technological advances;

Objectives

Students will

Improve cardiovascular fitness

Improve flexibility

Make activity choices for themselves

Complete sit and reach test

Do Now

Be on time for class.

Bring your planner.

Write down the daily information.

Get dressed into PE clothes in four minutes.

Equipment

Heart rate monitors

Transmitters

Sit and reach box

Presidential standards

Basketballs

Volleyballs

Jump ropes

Hula hoops

Content

41. Take attendance (2 minutes)
42. Do now procedures (4 minutes)
43. Warm up (5 minutes) run laps around the gym
44. Focus on flexibility (5 minutes)

FOCUS ON FLEXIBILITY

ARMS	LEGS & LOWER BACK
double rotations forward	standing toe touch
double rotations backwards	standing to the middle
tricep stretch right and left	Right and left
Shoulder stretch right and left	Lunge right and left
BACK & ABS	Butterfly
Pretzel right and left	Seated toe touch
cat stretch	calf stretch

45. Give students instructions about activity choices and remind them of daily expectation points. Choices include:

- a. Volleyball
- b. Basketball
- c. Jump ropes
- d. Tag or running games
- e. Hula hoops
- f. Walking

5. Sit and Reach test needs to be administered to each student during class today.
Assessment

In-Class Daily Expectations

(10 Points)

<p>2 Point = Punctuality</p> <ul style="list-style-type: none"> • Reports to the locker room on time • Reports to class on time • Tardiness = minus 1 point <p>-Ex/ tardy to both locker room & class = minus 2 points</p>
<p>2 Point = Appropriate Social Skills</p> <ul style="list-style-type: none"> • Positive interaction • Positive leadership • Appropriate language
<p>1 Point = Safety</p> <ul style="list-style-type: none"> • Proper use of facilities • Proper use of equipment
<p>1 Points = Class Procedures</p> <ul style="list-style-type: none"> • Follows class policies • Follows locker room policies • Has an appropriate change of clothing for class • Follows directions
<p>4 Points = Work Ethics</p> <ul style="list-style-type: none"> • On task • Active involvement • Acceptable effort • Applies concepts and strategies • Applies learned motor skills

Closure

The school year is winding down and there have been many different activities in class this year. Ask students to name some activities. Then ask each student to name their favorite activity. Then ask students if that activity is something they can participate in outside of school.

APPENDIX E

STATISTICAL TEST RESULTS

Physical Activity Levels in Physical Education Classes

Student ID	Fitness Level	Gender	Age	Team Sport #1	Team Sport #2	Aerobics #1	Aerobics #2	Student Choice
8	high	female	12	0.7820	0.8200	0.8720	0.9040	0.7070
10	average	male	12	0.4890	0.4950	0.3920	0.3220	0.5150
15	high	male	11	0.7920	0.8580	0.8370		0.6820
16	high	female	12	0.7130	0.2940	0.1120	0.5230	0.2490
19	average	female	11	0.7400	0.8140	0.6710	0.3560	0.7580
21	low	male	13	0.6880	0.5380	0.1710	0.7500	0.2040
29	average	male	12	0.5740	0.6560	0.1070	0.4480	0.4020
30	low	male	12	0.6090		0.5500		0.3360
31	low	male	11	0.5510	0.7800	0.1350	0.2270	0.5290
41	high	male	11	0.6490	0.7500	0.2940	0.4630	0.2040
44	average	female	11	0.6640	0.6380	0.4700	0.4055	0.4230
52	high	male	12	0.7810	0.8040	0.4580		0.8770
53	average	male	12	0.6490	0.7940	0.8690	0.8110	0.6650
63	average	female	11	0.5950	0.6270	0.8090	0.3070	0.5660
78	average	male	11	0.7340	0.7250	0.2460	0.4060	
84	high	female	12		0.7200	0.8810	0.6610	0.7710
87	low	male	12	0.4570	0.6870	0.1540	0.3410	0.3490

Student ID	Fitness Level	Gender	Age	Team Sport	(Team Sport) ²	Aerobics	(Aerobics) ²	Student Choice	(Student Choice) ²	
8	high	female	12	0.8010	0.6416	0.8880	0.7885	0.6550	0.4998	
10	average	male	12	0.4920	0.2421	0.3570	0.1274	0.4450	0.2652	
15	high	male	11	0.8250	0.6806	0.8370	0.7006	0.6820	0.4651	
16	high	female	12	0.5035	0.2535	0.3175	0.1008	0.1730	0.0620	
19	average	female	11	0.7770	0.6037	0.5135	0.2637	0.6940	0.5746	
21	low	male	13	0.6130	0.3758	0.4605	0.2121	0.1780	0.0416	
29	average	male	12	0.6150	0.3782	0.2775	0.0770	0.3410	0.1616	
30	low	male	12	0.6090	0.3709	0.5500	0.3025	0.2370	0.1129	
31	low	male	11	0.6655	0.4429	0.1810	0.0328	0.3790	0.2796	
41	high	male	11	0.6995	0.4893	0.3785	0.1433	0.1780	0.0416	
44	average	female	11	0.6510	0.4238	0.4378	0.1916	0.3420	0.1789	
52	high	male	12	0.7925	0.6281	0.4580	0.2098	0.8670	0.7691	
53	average	male	12	0.7215	0.5206	0.8400	0.7056	0.6225	0.4422	
63	average	female	11	0.6110	0.3733	0.5580	0.3114	0.4910	0.3204	
78	average	male	11	0.7295	0.5322	0.3260	0.1063			
84	high	female	12	0.7200	0.5184	0.7710	0.5944	0.7490	0.5944	
87	low	male	12	0.5720	0.3272	0.2475	0.0613	0.2280	0.1218	
				Σ	11.3980	7.8021	8.3988	4.9290	7.2415	4.9312

A=	17.6623
B=	14.6213
C=	15.0688

Source	SS	df	MS	F
between	0.4475	2	0.8950	0.0073
within	2.5934	47	121.8917	
total	3.0409	49		

Gender	Fitness Level	Student ID	Age	Team Sport #1	Team Sport #2	Aerobics #1	Aerobics #2	Student Choice
female	high	8	12	0.7820	0.8200	0.8720	0.9040	0.7070
female	average	19	11	0.7400	0.8140	0.6710	0.3560	0.7560
female	average	63	11	0.5950	0.6270	0.8090	0.3070	0.5660
female	high	84	12		0.7200	0.8810	0.6610	0.7710
female	high	16	12	0.7130	0.2940	0.1120	0.5230	0.2490
female	average	44	11	0.6640	0.6380	0.4700	0.4055	0.4230

Gender	Fitness Level	Student ID	Age	Team Sport	(Team Sport) ²	Aerobics	(Aerobics) ²	Student Choice	(Student Choice) ²	
female	high	8	12	0.8010	0.6416	0.8880	0.7885	0.6550	0.4290	
female	average	19	11	0.7770	0.6037	0.5135	0.2637	0.6940	0.4816	
female	average	63	11	0.6110	0.3733	0.5580	0.3114	0.4910	0.2411	
female	high	84	12	0.7200	0.5184	0.7710	0.5944	0.7490	0.5610	
female	high	16	12	0.5035	0.2535	0.3175	0.1008	0.6620	0.4382	
female	average	44	11	0.6510	0.4238	0.4378	0.1916	0.3420	0.1170	
				Σ	4.0635	2.8144	3.4858	2.2505	3.5930	2.2680

A=	7.3328
B=	6.8972
C=	6.9287

Source	SS	df	MS	F
between	0.0315	2	0.0630	0.0104
within	0.4041	15	0.0613	
total	0.4356	17		

Gender	Fitness Level	Student ID	Age	Team Sport #1	Team Sport #2	Aerobics #1	Aerobics #2	Student Choice
male	average	10	12	0.4890	0.4950	0.3920	0.3220	0.5150
male	high	15	11	0.7920	0.8580	0.8370		0.6820
male	low	21	13	0.6880	0.5380	0.1710	0.7500	0.2040
male	average	29	12	0.5740	0.6560	0.1070	0.4480	0.4020
male	low	30	12	0.6090		0.5500		0.3360
male	low	31	11	0.5510	0.7800	0.1350	0.2270	0.5290
male	high	41	11	0.6490	0.7500	0.2940	0.4630	0.2040
male	high	52	12	0.7810	0.8040	0.4580		0.8770
male	average	53	12	0.6490	0.7940	0.8690	0.8110	0.6650
male	average	78	11	0.7340	0.7250	0.2460	0.4060	0.0000
male	low	87	12	0.4570	0.6870	0.1540	0.3410	0.3490

Gender	Fitness Level	Student ID	Age	Team Sport	(Team Sport) ²	Aerobics	(Aerobics) ²	Student Choice	(Student Choice) ²	
male	average	10	12	0.4920	0.2421	0.3570	0.1274	0.4450	0.198025	
male	high	15	11	0.8250	0.6806	0.8370	0.7006	0.6620	0.438244	
male	low	21	13	0.6130	0.3758	0.4605	0.2121	0.1780	0.031684	
male	average	29	12	0.5150	0.3782	0.2775	0.0770	0.3410	0.116281	
male	low	30	12	0.6090	0.3709	0.5500	0.3025	0.2370	0.056169	
male	low	31	11	0.6655	0.4429	0.1810	0.0328	0.3790	0.143641	
male	high	41	11	0.6995	0.4893	0.3785	0.1433	0.1780	0.031684	
male	high	52	12	0.7925	0.6281	0.4580	0.2098	0.8670	0.751689	
male	average	53	12	0.7215	0.5206	0.8400	0.7056	0.6225	0.3875063	
male	average	78	11	0.7295	0.5322	0.3260	0.1063			
male	low	87	12	0.5720	0.3272	0.2475	0.0613	0.2280	0.051984	
				Σ	7.3345	4.9877	4.9130	2.6785	4.1375	2.2069073

A=	9.8731
B=	8.3896
C=	8.7967

Source	SS	df	MS	F
between	0.4070	2	0.8141	0.0252
within	1.0765	30	0.0359	
total	1.4835	32		

Fitness Level	Student ID	Gender	Age	Team Sport #1	Team Sport #2	Aerobics #1	Aerobics #2	Student Choice	
average	10	male		12	0.4890	0.4950	0.3920	0.3220	0.5150
average	19	female		11	0.7400	0.8140	0.6710	0.3560	0.7580
average	29	male		12	0.5740	0.6560	0.1070	0.4480	0.4020
average	44	female		11	0.6640	0.6380	0.4700	0.4055	0.4230
average	53	male		12	0.6490	0.7940	0.8690	0.8110	0.6650
average	63	female		11	0.5950	0.6270	0.8090	0.3070	0.5660
average	78	male		11	0.7340	0.7250	0.2460	0.4060	

Fitness Level	Student ID	Gender	Age	Team Sport	(Team Sport) ²	Aerobics	(Aerobics) ²	Student Choice	(Student Choice) ²	
average	10	male		12	0.4920	0.2421	0.3570	0.1274	0.1980	
average	19	female		11	0.7770	0.6037	0.5135	0.2637	0.6940	
average	29	male		12	0.6150	0.3782	0.2775	0.0770	0.1163	
average	44	female		11	0.6510	0.4238	0.4378	0.1916	0.3420	
average	53	male		12	0.7215	0.5206	0.8400	0.7056	0.3875	
average	63	female		11	0.6110	0.3733	0.5580	0.3114	0.2411	
average	78	male		11	0.7295	0.5322	0.3260	0.1063		
				Σ	4.5970	3.0739	3.3098	1.7830	2.9355	1.5415

A=	6.3984
B=	5.8777
C=	6.0200

Source	SS	df	MS	F
between	0.1423	2	0.2846	0.0443
within	0.3783	17	6.4318	
total	0.5206	19		

Fitness Level	Student ID	Gender	Age	Team Sport #1	Team Sport #2	Aerobics #1	Aerobics #2	Student Choice	
high	8	female		12	0.7820	0.8200	0.8720	0.9040	0.7070
high	15	male		11	0.7920	0.8560	0.8370		0.6820
high	16	female		12	0.7130	0.2940	0.1120	0.5230	0.2490
high	41	male		11	0.6490	0.7500	0.2940	0.4630	0.2040
high	52	male		12	0.7810	0.8040	0.4580		0.8770
high	84	female		12		0.7200	0.8810	0.6610	0.7710

Fitness Level	Student ID	Gender	Age	Team Sport	(Team Sport) ²	Aerobics	(Aerobics) ²	Student Choice	(Student Choice) ²	
high	8	female		12	0.8010	0.6416	0.8880	0.7885	0.6550	
high	15	male		11	0.8250	0.6806	0.8370	0.7006	0.438244	
high	16	female		12	0.5035	0.2535	0.3175	0.1008	0.029929	
high	41	male		11	0.6995	0.4893	0.3785	0.1433	0.031684	
high	52	male		12	0.7925	0.6281	0.4580	0.2098	0.751689	
high	84	female		12	0.7200	0.5184	0.7710	0.5944	0.516961	
				Σ	4.3415	3.2115	3.6500	2.5374	3.2540	2.1975

A=	7.9464
B=	7.0256
C=	7.1266

Source	SS	df	MS	F
between	0.1010	2	0.2020	0.0164
within	0.8198	15	12.2971	
total	0.9208	17		

Fitness Level	Student ID	Gender	Age	Team Sport #1	Team Sport #2	Aerobics #1	Aerobics #2	Student Choice	
low	21	male		13	0.6880	0.5380	0.1710	0.7500	0.2040
low	30	male		12	0.6090		0.5500		0.3360
low	31	male		11	0.5510	0.7800	0.1350	0.2270	0.5290
low	87	male		12	0.4570	0.6870	0.1540	0.3410	0.3490

Fitness Level	Student ID	Gender	Age	Team Sport	(Team Sport) ²	Aerobics	(Aerobics) ²	Student Choice	(Student Choice) ²	
low	21	male		13	0.6130	0.3758	0.4605	0.2121	0.1780	
low	30	male		12	0.6090	0.3709	0.5500	0.3025	0.2370	
low	31	male		11	0.6655	0.4429	0.1810	0.0328	0.3790	
low	87	male		12	0.5720	0.3272	0.2475	0.0613	0.2280	
				Σ	2.4595	1.5167	1.4390	0.6086	1.0220	0.2835

A=	2.4088
B=	2.0176
C=	2.2911

Source	SS	df	MS	F
between	0.2735	2	0.5470	0.5164
within	0.1177	9	1.0592	
total	0.3912	11		

TEAM SPORTS

Low	(Low) ²	Average	(Average) ²	High	(High) ²
0.6130	0.3758	0.4920	0.2421	0.8010	0.6416
0.6090	0.3709	0.7770	0.6037	0.8250	0.6806
0.6655	0.4429	0.6150	0.3782	0.5035	0.2535
0.5720	0.3272	0.6510	0.4238	0.6995	0.4893
		0.7215	0.5206	0.7925	0.6281
		0.6110	0.3733	0.7200	0.5184
		0.7295	0.5322		
Σ	2.4595	1.5167	4.5970	3.0739	4.3415

A=	7.8021
B=	7.6420
C=	7.6726

Source	SS	df	MS	F
between	0.0306	2	0.0612	0.0338
within	0.1295	14	1.8124	
total	0.1601	16		

AEROBICS

Low	(Low) ²	Average	(Average) ²	High	(High) ²
0.4605	0.2121	0.3570	0.1274	0.8880	0.7885
0.5500	0.3025	0.5135	0.2637	0.8370	0.7006
0.1810	0.0328	0.2775	0.0770	0.3175	0.1008
0.2475	0.0613	0.4378	0.1916	0.3785	0.1433
		0.8400	0.7056	0.4580	0.2098
		0.5580	0.3114	0.7710	0.5944
		0.3260	0.1063		
Σ	1.4390	0.6086	3.3098	1.7830	3.6500

A=	4.9290
B=	4.1494
C=	4.3030

Source	SS	df	MS	F
between	0.1537	2	0.3073	0.0351
within	0.6259	14	8.7633	
total	0.7796	16		

STUDENT CHOICE						
Low	(Low) ²	Average	(Average) ²	High	(High) ²	
0.1780	0.0317	0.4450	0.1980	0.6550	0.4290	
0.2370	0.0562	0.6940	0.4816	0.6620	0.4382	
0.3790	0.1436	0.3410	0.1163	0.1730	0.0299	
0.2280	0.0520	0.3420	0.1170	0.1780	0.0317	
		0.6225	0.3875	0.8670	0.7517	
		0.4910	0.2411	0.7490	0.5610	
Σ	1.0220	0.2835	2.9355	1.5415	3.2840	2.2416

A=	4.0665				
B=	3.2775				
C=	3.4948				

Source	SS	df	MS	F
between	0.2173	2	0.4346	0.0585
within	0.5718	13	7.4332	
total	0.7891	15		

Mean of percentage of time spent at or above target heart rate for team sports classes for all participants	0.6708438
Mean of percentage of time spent at or above target heart rate for aerobics classes for all participants	0.4823387
Mean of percentage of time spent at or above target heart rate for student choice classes for all participants	0.5148125
Standard deviation of time spent at or above target heart rate for team sports classes for all participants	0.1259014
Standard deviation of time spent at or above target heart rate for aerobics for all participants	0.2581013
Standard deviation of time spent at or above target heart rate for student choice classes for all participants	0.2145859

team sports	aerobics	student choice
0.7820	0.8720	0.7070
0.4890	0.3920	0.5150
0.7920	0.8370	0.6620
0.7130	0.1120	0.2490
0.7400	0.6710	0.7580
0.6880	0.1710	0.2040
0.5740	0.1070	0.4020
0.6090	0.5500	0.3360
0.5510	0.1350	0.5290
0.6490	0.2940	0.2040
0.6640	0.4700	0.4230
0.7810	0.4580	0.8770
0.6490	0.8690	0.6650
0.5950	0.8090	0.5660
0.7340	0.2460	0.7710
0.4570	0.8810	0.3490
0.8200	0.1540	8.2370
0.4950	0.9040	
0.8580	0.3220	
0.2940	0.5230	
0.8140	0.3560	
0.5380	0.7500	
0.6560	0.4480	
0.7800	0.2270	
0.7500	0.4630	
0.6380	0.4055	
0.8040	0.8110	
0.7940	0.3070	
0.6270	0.4060	
0.7250	0.6610	
0.7200	0.3410	
0.6870	14.9525	
21.4670		

Mean of low fitness students in team sports		0.6157143
Mean of low fitness students in aerobics		0.3325714
Mean of low fitness students in student choice		0.3545
Standard deviation of low fitness students in team sports		0.1101207
Standard deviation of low fitness students in aerobics		0.2344375
Standard deviation of low fitness students in student choice		0.1335078
team sports	aerobics	students choice
0.6880	0.1710	0.2040
0.6090	0.5500	0.3360
0.5510	0.1350	0.5290
0.4570	0.1540	0.3490
0.5380	0.7500	1.418
0.7800	0.2270	
0.6870	0.3410	
4.31	2.328	

Mean of average fitness students in team sports		0.6567143
Mean of average fitness students in aerobics		0.4728214
Mean of average fitness students in student choice		0.5548333
Standard deviation of average fitness students in team sports		0.0990085
Standard deviation of average fitness students in aerobics		0.2302057
Standard deviation of average fitness students in student choice		0.138465
team sports	aerobics	student choice
0.4890	0.3920	0.5150
0.7400	0.6710	0.7580
0.5740	0.1070	0.4020
0.6640	0.4700	0.4230
0.6490	0.8690	0.6650
0.5950	0.8090	0.5660
0.7340	0.2460	3.329
0.4950	0.3220	
0.8140	0.3560	
0.6560	0.4480	
0.6380	0.4055	
0.7940	0.8110	
0.6270	0.3070	
0.7250	0.4060	
9.194	6.6195	

Mean of high fitness students in team sports		0.7239091
Mean of high fitness students in aerobics		0.6005
Mean of high fitness students in student choice		0.5816667
Standard deviation of high fitness students in team sports		0.1536707
Standard deviation of high fitness students in aerobics		0.2910806
Standard deviation of high fitness students in student choice		0.2835995
team sports	aerobics	student choice
0.7820	0.8720	0.7070
0.7920	0.8370	0.6820
0.7130	0.1120	0.2490
0.6490	0.2940	0.2040
0.7810	0.4580	0.8770
0.8200	0.8810	0.7710
0.8580	0.9040	3.49
0.2940	0.5230	
0.7500	0.4630	
0.8040	0.6610	
0.7200	6.0050	
7.963		

Fitness Level	Student ID	Gender	Age	Team Sport #1	Team Sport #2	Aerobics #1	Aerobics #2	Student Choice
low	21	male	13	31:40	25:10	7:55	35:20	9:15
low	30	male	12	27:25			24:05	14:55
low	31	male	11	24:40	36:25	6:10	8:45	23:35
low	87	male	12	21:30	30:35	5:40	15:60	13:25
			Lesson Averages	26:19	30:43	6:35	21:03	15:18
			Activity Averages	28:31		13:49		15:18

Fitness Level	Student ID	Gender	Age	Team Sport #1	Team Sport #2	Aerobics #1	Aerobics #2	Student Choice
average	10	male	12	22:00	21:45	18:05	14:55	27:55
average	19	female	11	33:15	37:35	31:25	16:10	33:35
average	29	male	12	26:25	31:05	5:05	21:15	18:20
average	44	female	11	28:50	23:45	22:25	18:15	19:10
average	53	male	12	30:30	35:15	39:35	39:25	36:48
average	63	female	11	28:15	24:00	38:50	10:50	24:40
average	78	male	11	31:30	31:25	4:15	18:40	
			Lesson Averages	28:41	29:16	22:42	19:56	26:45
			Activity Averages	28:59		21:19		26:45

Fitness Level	Student ID	Gender	Age	Team Sport #1	Team Sport #2	Aerobics #1	Aerobics #2	Student Choice
high	8	female	12	36:50	37:40	30:35	42:30	30:25
high	15	male	11	37:45	40:30		37:35	30:55
high	16	female	12	33:20	13:15	5:15	25:05	11:15
high	41	male	11	25:45	33:00	12:45	20:40	9:15
high	52	male	12	36:30	35:00	20:40		40:35
high	84	female	12		31:45	40:05	30:40	33:45
			Lesson Averages	34:02	31:52	21:52	31:18	26:02
			Activity Averages	32:57		26:35		26:02

APPENDIX F

CLASS SUMMARY REPORT FOR EACH TYPE OF ACTIVITY

Heart Rate Class Summary Report

Report Date: Thursday, June 22, 2006

Teacher: Martinez, Sandra

Date Range: Wed 1/4/2006 - Mon 5/22/2006

Sorted By: Student Name

Course: 6th grade Physical Education

Activities: Basketball, Soccer

ID	Name	Sections	Avg Time	Below Zone	In Zone	Above Zone	Average Heart Rate	<input type="checkbox"/> Below <input type="checkbox"/> In <input type="checkbox"/> Above
123430789	Avr. Age: 10	2	44:25	22:35 (50.5%)	21:50 (49.2%)	0:00 (0.0%)	141	
	Total Time:		1:28:50	45:30	43:45	0:00		
123430789	Avr. Age: 13	2	45:30	18:07 (39.8%)	36:23 (79.8%)	0:00 (0.0%)	162	
	Total Time:		1:31:00	20:15	1:10:45	0:00		
123430789	Avr. Age: 29	2	47:13	16:30 (34.8%)	28:43 (60.5%)	0:17 (0.3%)	100	
	Total Time:		1:34:25	36:20	57:30	0:35		
123430789	Avr. Age: 44	2	42:53	14:37 (34.2%)	26:16 (62.3%)	1:00 (2.3%)	101	
	Total Time:		1:24:05	29:15	52:35	2:10		
123430789	Avr. Age: 33	2	45:33	12:30 (28.1%)	32:03 (71.5%)	0:00 (0.0%)	162	
	Total Time:		1:31:25	25:40	1:05:45	0:00		
123430789	Avr. Age: 63	2	42:53	16:45 (38.1%)	26:08 (60.9%)	0:00 (0.0%)	109	
	Total Time:		1:29:45	33:30	56:15	0:00		
123430789	Avr. Age: 78	2	44:13	11:37 (26.0%)	31:28 (71.2%)	0:38 (0.8%)	163	
	Total Time:		1:28:25	23:55	1:02:55	1:35		
123430789	Hgt. 18	2	47:30	8:20 (17.3%)	36:07 (76.3%)	0:03 (0.3%)	174	
	Total Time:		1:35:00	16:40	1:18:15	0:10		
123430789	Hgt. 16	2	46:25	22:45 (48.3%)	23:38 (50.3%)	0:17 (0.3%)	147	
	Total Time:		1:32:40	45:30	46:35	0:35		
123430789	Hgt. 11	2	43:33	13:02 (29.9%)	28:23 (64.8%)	1:08 (2.3%)	108	
	Total Time:		1:27:05	26:05	56:45	2:10		
123430789	Hgt. 30	2	45:15	9:23 (20.6%)	35:45 (78.0%)	0:05 (0.2%)	163	
	Total Time:		1:30:30	18:50	1:11:30	0:10		
123430789	Hgt. 8	2	46:30	9:15 (19.6%)	37:15 (80.1%)	0:00 (0.0%)	172	
	Total Time:		1:33:00	18:30	1:14:30	0:00		
123430789	Hgt. 64	1	44:55	12:25 (27.6%)	31:40 (70.8%)	0:00 (0.0%)	108	
	Total Time:		44:55	12:25	31:40	0:00		
123430789	Low: 21	2	46:30	16:00 (34.5%)	28:25 (61.1%)	0:05 (0.3%)	108	
	Total Time:		1:33:05	36:00	56:50	0:15		
123430789	Low: 30	1	45:50	7:35 (16.1%)	37:25 (80.9%)	0:00 (0.0%)	100	
	Total Time:		45:50	7:35	37:25	0:00		

DL = Downloaded

Sandra Martinez

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POLAR.

Heart Rate Class Summary Report

Report Date: Thursday, June 22, 2006

Teacher: Martinez, Sandra
Course: 6th grade Physical EducationDate Range: Wed 1/4/2006 - Mon 5/22/2006
Activities: Basketball, Soccer

Sorted By: Student Name

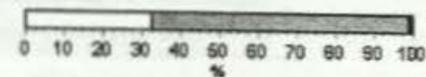
ID	Name	Sessions	Avg Time	Below Zone	In Zone	Above Zone	Average Heart Rate	<input type="checkbox"/> Below <input checked="" type="checkbox"/> In <input type="checkbox"/> Above
123456789	Low, 31	2	45:43	15:10 (33.2%)	30:33 (66.8%)	0:00 (0.0%)	155	
		Total Time:	1:31:25	30:20	1:01:05	0:00		
123456789	Low, 8	2	45:43	15:13 (33.1%)	30:30 (66.9%)	0:00 (0.0%)	151	
		Total Time:	1:31:30	30:25	1:01:05	0:00		

SUMMARY

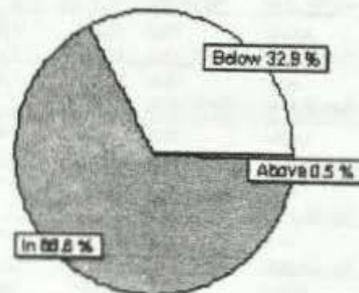
Sessions: 22

Average: 45:14 14:51 (32.9%) 30:28 (66.9%) 0:18 (0.1%)

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Course Summary



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Sandra Martinez

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POLAR.

Heart Rate Class Summary Report

Report Date: Thursday, June 22, 2006

Teacher: Martinez, Sandra
Course: 6th grade Physical EducationDate Range: Wed 1/4/2006 - Mon 5/22/2006
Activities: Cardio Circuit, TAEBO

Sorted By: Student Name

ID	Name	Sessions	Avg Time	Below Zone	In Zone	Above Zone	Average Heart Rate	<input type="checkbox"/> Below <input type="checkbox"/> In <input type="checkbox"/> Above
123456789	Ave Age, 10	2	46:13	29:43 (64.3%)	16:30 (35.7%)	0:00 (0.0%)	137	
	Total Time:		1:32:26	59:25	32:00	0:00		
123456789	Ave Age, 19	2	46:08	29:20 (63.1%)	15:48 (33.8%)	0:00 (0.0%)	145	
	Total Time:		1:32:16	58:40	31:36	0:00		
123456789	Ave Age, 29	2	47:27	34:17 (72.3%)	13:10 (27.7%)	0:00 (0.0%)	156	
	Total Time:		1:34:35	1:06:35	28:00	0:00		
123456789	Ave Age, 44	3	31:06	17:35 (56.5%)	12:56 (41.0%)	1:25 (4.3%)	148	
	Total Time:		1:33:26	52:45	38:28	4:15		
123456789	Ave Age, 53	2	47:02	7:33 (16.1%)	36:52 (77.6%)	0:38 (0.8%)	164	
	Total Time:		1:34:05	15:05	1:17:45	1:15		
123456789	Ave Age, 63	2	41:29	19:48 (47.2%)	21:39 (52.7%)	0:00 (0.0%)	153	
	Total Time:		1:23:15	39:35	43:40	0:00		
123456789	Ave Age, 78	2	31:36	20:10 (63.8%)	11:27 (36.2%)	0:00 (0.0%)	136	
	Total Time:		1:03:15	40:20	22:55	0:00		
123456789	Hija, 15	1	44:55	7:20 (16.3%)	37:25 (83.3%)	0:10 (0.4%)	165	
	Total Time:		44:55	7:20	37:25	0:10		
123456789	Hija, 16	2	47:30	32:20 (68.0%)	15:00 (31.6%)	0:10 (0.4%)	158	
	Total Time:		1:35:00	1:04:40	30:00	0:20		
123456789	Hija, 41	2	44:03	27:20 (61.8%)	16:18 (36.9%)	0:27 (0.6%)	159	
	Total Time:		1:28:05	54:40	32:30	0:55		
123456789	Hija, 52	1	45:10	24:30 (54.1%)	20:40 (45.8%)	0:00 (0.0%)	140	
	Total Time:		45:10	24:30	20:40	0:00		
123456789	Hija, 8	2	41:02	4:30 (11.0%)	36:33 (88.0%)	0:00 (0.0%)	170	
	Total Time:		1:22:05	9:00	1:13:05	0:00		
123456789	Hija, 84	2	45:38	10:35 (23.0%)	35:03 (77.0%)	0:00 (0.0%)	160	
	Total Time:		1:31:55	21:10	1:10:45	0:00		
123456789	Low, 21	2	46:40	25:02 (53.7%)	21:38 (46.3%)	0:00 (0.0%)	146	
	Total Time:		1:33:20	50:05	43:15	0:00		
123456789	Low, 36	1	43:45	19:40 (45.0%)	24:05 (55.0%)	0:00 (0.0%)	149	
	Total Time:		43:45	19:40	24:05	0:00		

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Sandra Martinez

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Heart Rate Class Summary Report

Report Date: Thursday, June 22, 2006

Teacher: **Martine Sander** Date Range: **Wed 1/4/2006 - Mon 5/22/2006**
 Course: **6th grade Physical Education** Activities: **Cardio Circuit, TABEO**

Sorted By: **Student Name**

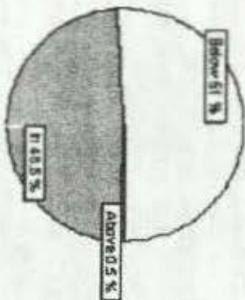
ID	Name	Sections	Avg Time	Days Done	# Done	Hours Done	Average HeartRate
123456789	John K.	2	12:05	31.2%	1.28	0:07:27%	134
123456789	Jane K.	2	12:10	100.0%	14.28	0:00	142
123456789	Bob K.	2	11:50	31.2%	0.28	0:00	114
123456789	Tom K.	2	12:10	100.0%	21.28	0:00	142

SUMMARY

Sections: 2 Average: 42:41 21.48(1.0%), 29.21(4.2%), 4:10(4.3%)



Course Summary



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Heart Rate Class Summary Report

Report Date: Thursday, June 22, 2006

Teacher: Martinez, Sandra
 Course: 6th grade Physical Education
 Date Range: Wed 5/16/2006 - Mon 5/22/2006
 Activities: Student Choice

Sorted By: Student Name

ID	Name	Students	Avg Time	Change Time	F 2006	Above Zone	Average HeartRate
23130789	Aur Wyn 10	1	64:15	26:20 (40.2%)	2:56 (4.2%)	0:00 (0.0%)	143
	Total Time #:	1	64:15	26:20	2:56	0:00	
23130789	Aur Wyn 19	1	44:29	10:38 (23.2%)	30:38 (72.8%)	0:00 (0.0%)	102
	Total Time #:	1	44:29	10:38	30:38	0:00	
23130789	Aur Wyn 29	1	42:30	27:25 (65.2%)	15:15 (36.0%)	0:00 (0.0%)	141
	Total Time #:	1	42:30	27:25	15:15	0:00	
23130789	Aur Wyn 11	1	42:20	25:10 (59.2%)	17:10 (40.8%)	1:33 (3.2%)	115
	Total Time #:	1	42:20	25:10	17:10	1:33	
23130789	Aur Wyn 23	2	40:20	18:25 (45.3%)	21:55 (54.7%)	0:00 (0.0%)	140
	Total Time #:	2	1:00:40	37:50	1:12:35	0:00	
23130789	Aur Wyn 43	1	40:35	18:55 (46.1%)	21:35 (53.9%)	0:03 (0.2%)	146
	Total Time #:	1	40:35	18:55	21:35	0:03	
23130789	Hugh 13	1	42:20	11:25 (26.5%)	30:50 (73.5%)	0:23 (0.3%)	102
	Total Time #:	1	42:20	11:25	30:50	0:23	
23130789	Hugh 16	1	42:15	21:00 (49.1%)	11:15 (26.9%)	0:00 (0.0%)	133
	Total Time #:	1	42:15	21:00	11:15	0:00	
23130789	Hugh 11	1	42:05	26:10 (62.2%)	9:15 (21.8%)	0:00 (0.0%)	138
	Total Time #:	1	42:05	26:10	9:15	0:00	
23130789	Hugh 25	1	42:12	15:00 (35.6%)	27:12 (64.4%)	0:00 (0.0%)	112
	Total Time #:	1	42:12	15:00	27:12	0:00	
23130789	Hugh 6	1	43:00	12:35 (29.2%)	30:25 (70.8%)	0:00 (0.0%)	137
	Total Time #:	1	43:00	12:35	30:25	0:00	
23130789	Hugh 14	1	43:32	9:50 (22.9%)	33:42 (77.1%)	0:00 (0.0%)	139
	Total Time #:	1	43:32	9:50	33:42	0:00	
23130789	Lark 21	1	42:22	26:15 (61.9%)	9:15 (21.8%)	0:00 (0.0%)	135
	Total Time #:	1	42:22	26:15	9:15	0:00	
23130789	Lark 30	1	44:20	25:25 (57.1%)	11:55 (26.8%)	0:00 (0.0%)	138
	Total Time #:	1	44:20	25:25	11:55	0:00	
23130789	Lark 31	1	44:38	21:00 (47.1%)	23:38 (52.9%)	0:00 (0.0%)	143
	Total Time #:	1	44:38	21:00	23:38	0:00	

Show Hide Rows



Heart Rate Class Summary Report

Report Date: Thursday, June 22, 2006

Teacher: Martinez, Sandra

Date Range: Wed 1/4/2006 - Mon 5/22/2006

Sorted By: Student Name

Course: 6th grade Physical Education

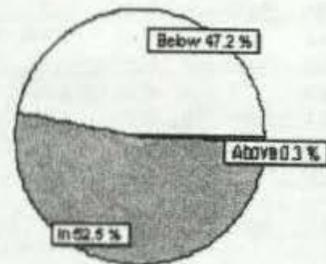
Activities: Student Choice

ID	Area	Sessions	Avg Time	Below Zone	In Zone	Above Zone	Average HeartRate	<input type="checkbox"/> Below <input type="checkbox"/> In <input type="checkbox"/> Above
123456789	Low, H	1	36:25	25:00 (68.1%)	13:25 (34.9%)	0:00 (0.0%)	110	
Total Time:		36:25	25:00	13:25	0:00			

SUMMARY

Sessions: 1	Average:	36:11	21:29 (47.2%)	14:14 (61.9%)	0:39 (0.3%)	144	
							0 10 20 30 40 50 60 70 80 90 100 %

Course Summary



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Sandra Martinez

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APPENDIX G

SAMPLES OF INDIVIDUAL HEART RATE REPORTS

Individual Heart Rate Curve Report

Report Date: Thursday, June 22, 2006

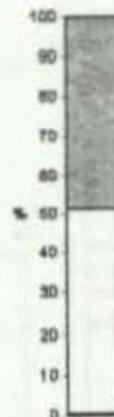
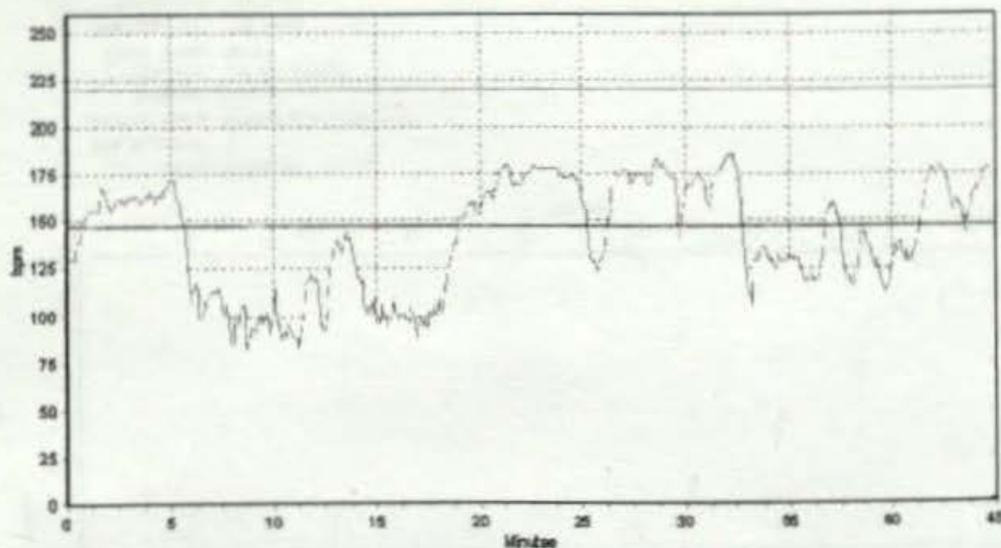
Teacher: Martinez, Sandra

Date Range: Wed 1/4/2006 - Mon 5/22/2006

Course: 8th grade Physical Education

Activities: Soccer

Student: 10 Average



Target Zone	146-220 bpm
Above Zone	000 (0.0%)
In Zone	2200 (45.9%)
Below Zone	2300 (51.1%)

HRM: HRM #1 (VXL)
 File Number: 1
 Session Date: 5/1/2006 8:40:34 PM
 Interval: 5 sec
 Activity: Soccer
 Total Time: 45:00
 Average HR: 141 bpm
 Recovery: 47 bpm
 Total Beats: 6333
 Max HR Achieved: 185 bpm
 First lap warm-up: No
 Last lap cool-down: No
 Comments:

Sandra Martinez

Page: 1

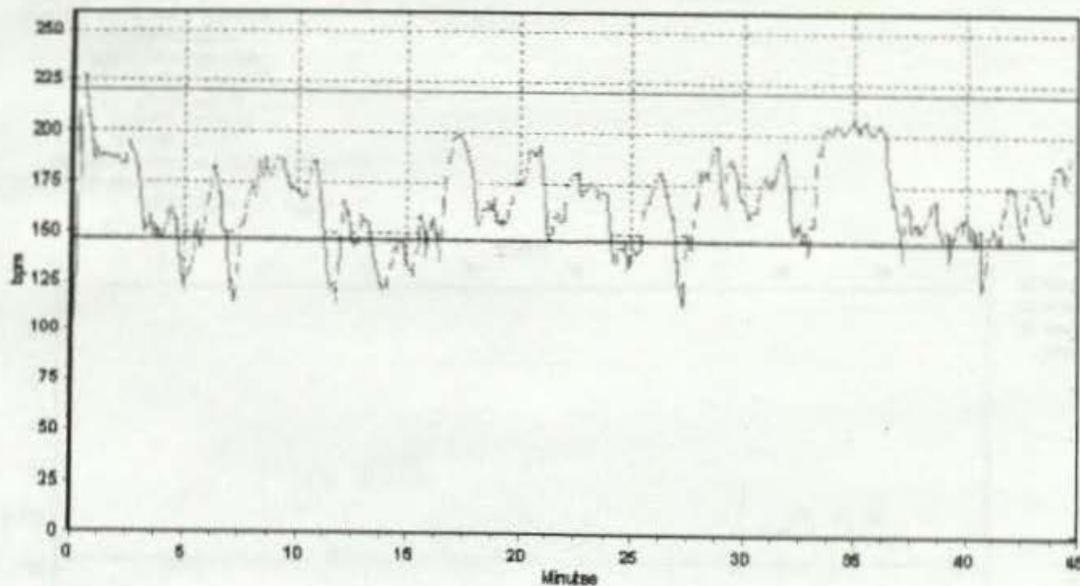
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Individual Heart Rate Curve Report

Report Date: Thursday, June 22, 2006

Teacher: Martinez, Sandra
 Course: 6th grade Physical Education
 Student: 15 High

Date Range: Wed 1/4/2006 - Mon 5/22/2006
 Activities: Cardio Circuit



Target Zone 146-200 bpm
 Above Zone 0:10 (0.4%)
 In Zone 37:05 (83.3%)
 Below Zone 7:20 (16.3%)

HRM: HRM #0 (VXL)
 File Number: 1
 Session Date: 5/4/2006 8:10:37 PM
 Interval: 5 sec
 Activity: Cardio Circuit
 Total Time: 44:55
 Average HR: 165 bpm
 Recovery: 180 bpm
 Total Beats: 7398
 Max HR Achieved: 227 bpm
 First lap warm-up: No
 Last lap cool-down: No
 Comments:

Sandra Martinez

Page: 1

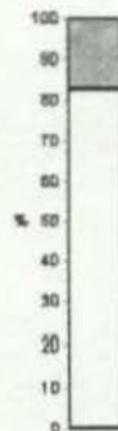
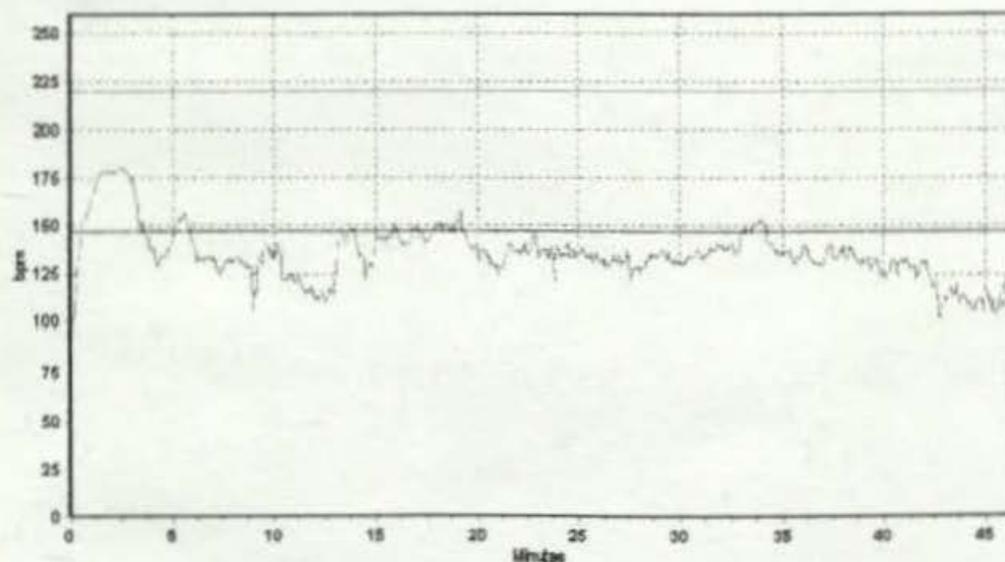
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Individual Heart Rate Curve Report

Report Date: Thursday, June 22, 2006

Teacher: Martinez, Sandra
 Course: 8th grade Physical Education
 Student: 21 Low

Date Range: Wed 1/4/2006 - Mon 5/22/2006
 Activities: TAEBO



Target Zone 145-220 bpm
 Above Zone 0:00 6.0%
 In Zone 7:55 47.1%
 Below Zone 36:20 46.9%

HRM: HRM #8 (VXL)
 File Number: 1
 Session Date: 5/22/2006 10:32:35 PM
 Interval: 5 sec
 Activity: TAEBO
 Total Time: 46:15
 Average HR: 134 bpm
 Recovery: 136 bpm
 Total Beats: 6186
 Max HR Achieved: 190 bpm
 First lap warm-up: No
 Last lap cool-down: No
 Comments:

Sandra Martinez

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