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Implementation of Classroom Physical Activity for Middle School Students

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Implementation of Classroom Physical Activity for Middle School Students

Blake Nicols

Capstone Project: A School Improvement Plan

Northwestern College, Orange City, Iowa

Abstract

The purpose of this school improvement plan is to increase the minutes of physical activity experienced by middle school students during the school day. Students are falling short in meeting the recommended 60 minutes of daily moderate-to-vigorous physical activity. With most schools returning to prior COVID-19 pandemic in-person learning, emphasis on students catching up in the core academic subjects such as math and reading exists. Time spent implementing classroom physical activity not only increases physical activity minutes, but it also has positive impacts on student focus, behavior, and academic performance. As students transition from the elementary school setting to secondary schools, a reduction occurs in physical activity experienced during the school day. This school improvement plan will provide middle school staff with resources to implement physical activity within the content area curriculum, activities, and lesson plans resulting in increased physical activity minutes experienced by students.

Keywords: physical activity, physical activity in classroom, middle school students, student behavior, academic performance

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Implementation of Classroom Physical Activity for Middle School Students

The current climate of primary, middle, and high school settings in the United States has placed increased emphasis on academic achievement. Most of the school day is allocated to academic instruction with the underlying goal of increasing student performance (Stapp, 2018). Increased technology use and the resulting screen time students engage in have adversely affected the opportunities for physical activity within the classroom. The problem is students' daily minutes engaged in physical activity have declined. About 24% of children and adolescents aged 6 to 17 years participate in the recommended amount of 60 minutes of moderate-to-vigorous physical activity daily (Katzmarzyk et al., 2018; Rosenkranz et al., 2020). Furthermore, the amount of time students engage in physical activity during the school day decreases as they move from elementary into secondary school settings. According to the *2016 Shape of the Nation Status of Physical Education in the USA*, approximately 8% of adolescents (ages 12-19) participated in the recommended 60 minutes of daily physical activity weekly (*SHAPE of the NATION™ 2*, 2016). Additionally, the impact of the COVID-19 pandemic has worsened the levels of physical activity in children and adolescents and increased sedentary behavior (Bates et al., 2020).

The purpose of this school improvement plan is to help improve academic performance and student behavior in classrooms for middle school students by implementing physical activity within the content area curriculum, activities, and lesson plans. Mavilidi et al. (2019) recognized the academic classroom as a viable setting to promote learning and health benefits through the integration of physical activity. Implementation of physical activity within the current setting is expected to reduce student struggles with classroom behavior problems, improve on-task focus, and enhance academic learning. Methods for the implementation of physical activity lessons and

activities in this school improvement plan will occur without creating stress for classroom teachers or overwhelming them with extra work.

Multiple studies have linked using physical activity in the classroom to improved student academic performance, improved student behavior, and time on-task (de Greeff et al., 2018; Goh, 2017; Müller et al., 2021). Resources for this project were compiled from the database in the DeWitt Library at Northwestern College and Google Scholar. Consideration was given to studies within the last 10 years and published in a peer-reviewed journal or by a government agency. Studies pertaining to classroom physical activity breaks, integration of physical activity, benefits of physical activity on student behavior and academic achievement, and school age children were reviewed.

Physical activities within the classroom have been shown to improve children's attention and learning. In various studies, classroom-based physical activities resulted in positive effects on students' attention and on-task behavior after participating in the activities (Carlson et al., 2015; Goh et al., 2018; Goh et al., 2016). Physical activities implemented in various subjects have been shown to improve cognitive and academic performance (de Greeff et al., 2018; Tomporowski et al., 2015). The implementation of physical activities within the classroom has positive effects on student behavior, on-task focus, and academic performance without detriment to academic instruction.

The 2020 World Health Organization guidelines on physical activity and sedentary behavior present the most recent recommendations for physical activity to promote healthy levels of these behaviors in various population categories including children aged 5-17 (Chaput et al., 2020; Okely et al., 2021). This literature review will first present research on the importance of physical activity for school-aged children. In addition, data on the implementation of physical

breaks in the elementary school setting will be discussed. The literature review will then examine specific types and duration of physical breaks and the effects on students. After that, the need for physical activity in the middle school setting will be addressed. Finally, literature addressing obstacles to the implementation of physical activity in classrooms and how to overcome them will be presented. This literature review will be the basis for this improvement plan to impact student behavior and the academic performance in a middle school's classrooms through the implementation of physical activity within content instruction.

Review of the Literature

The 2008 Physical Activity Guidelines for Americans was one of the first studies to recommend daily physical activity for school-aged students (Troiano, 2016). Guidelines for children and youth included at least sixty minutes of aerobic, muscle-strengthening, and bone-strengthening activities. A subsequent study identified the school setting as a key setting to increase physical activity opportunities for students. Physical activities implemented during classroom time as part of academic lessons or activity breaks can improve grades, standardized test scores, cognitive skills, concentration, and attention (*Physical Activity Guidelines for Americans Midcourse Report Strategies to Increase Physical Activity among Youth*, 2012). Various research conducted in the past 10 years has shown implementation of physical activity within the classroom not only increases opportunities to engage in physical activity, but also impacts student focus, behavior, and academic performance.

Physical Activity of School-Aged Children

The National Physical Activity Plan Alliance (NPAPA) has conducted comprehensive assessments of physical activity in U.S. children and youth. Its third report, the 2018 United States Report Card on Physical Activity for Children and Youth, updated the 2016 and 2014

reports. The NPAPA used data from nationally representative studies and surveys, peer-reviewed articles, and government reports in the assessment of 10 core physical activity indicators and assignment of grades. According to the review of the 2018 report conducted by Katzmarzyk et al. (2018), only 24% of U.S. children and youth ages 6 to 17 met the national recommendation of 60 minutes of daily physical activity, thereby receiving a grade of D- for Overall Physical Activity. It was also noted in determining this grade that a significant drop in the level of physical activity occurred with increasing age. The percentage that met physical activity recommendations for 6-11 year olds, 12-15 year olds and 16-19 year olds was 42.5%, 7.5% and 5.1% respectively. It was noted by Katzmarzyk et al. (2018) under the indicator Active Play, approximately 11%, 8%, and 2% of school districts require that elementary, middle, and high schools, respectively, provide regular classroom physical activity breaks during the school day. To make an impact on the near-failing grade for physical activity for children and youth, one recommendation was to facilitate strategies to increase physical activity within the school environment and address the disparities in participation across age.

Concern over the declining physical activity levels in children extends worldwide. National and international physical activity recommendations have suggested that children should spend at least 60 min in daily physical activity, yet a study reported only 19% of Australian children and adolescents met this recommendation (Mavilidi et al., 2019). The Australian study examined whether integrating physical activity into the school curriculum may be an effective way not only to enhance educational outcomes but also improve children's physical activity levels. Mavilidi et al. (2019) evaluated the impact of the 'Thinking While Moving in English' (TWM-E) program on children's physical activity, on-task behavior in the classroom, and academic achievement. TWM-E was studied in a cluster randomized controlled

trial, consisting of teacher-adapted lessons that incorporated movement-based activities into the learning curriculum 3×40 min per week over a 6-week period. This study showed that physically active lessons can enhance children's literacy attainment along with potential to combat the declining levels of physical activity in children (Mavilidi et al., 2020).

Systematic reviews have been conducted on the impact physical activity (PA) has on the cognitive functioning and academic learning of children and adolescents. In the meta-analysis study conducted by Álvarez-Bueno et al (2017), the effect of PA interventions on children's and adolescents' academic achievement and classroom behaviors was examined. In addition, characteristics of PA that are most favorable to aid the development of academic performance were studied. Twenty-six studies conducted from 1999 through 2016 were examined. Sixteen (62%) of the studies were conducted within the last 10 years. The majority (46.2%) of the studies studied PA integrated within the classroom. Physical activity through curricular instructed physical education occurred in 30.8% of the studies. Studies conducted in extracurricular activities and after-school programs accounted for 15.5% and 7.5% respectively. Ages of the participants ranged from 5-13 years of age. Álvarez-Bueno et al (2017) concluded that multiple facets of academic achievement are positively impacted by PA programs. Additionally, classroom behaviors are improved after PA interventions.

The onset of the COVID-19 pandemic brought disruptions to school-aged children's daily activities. School closures, stay-at-home orders, limited social activities and organized sports participation adversely affected the ability to achieve the daily recommended minutes of physical activity. A study that examined the moderate-to-vigorous intensity physical activity (MVPA) of adolescents aged 10-14 year olds during the COVID-19 pandemic found 8.9 % met the daily 60 minutes guideline during COVID compared to 16.1% before (Nagata et al., 2022). It

was reported that some studies found physical activity patterns of adolescents were more impacted by COVID-19 compared to younger children's physical activity. Nagata et al. (2022) analyzed data from a national study that surveyed 11,875 adolescents from 2016-2018 as a baseline with survey responses obtained in May, 2020. Based upon exclusion criteria, an analytic sample of 5,153 participants was evaluated. The findings from this study suggest approximately 9% of adolescents met the MVPA Guidelines early in the COVID-19 pandemic. It was suggested that further examination of MVPA levels be done to develop multi-level interventions to promote MVPA among adolescents.

Physical Activity Implemented in Elementary Schools

In 2014 a study in the United Kingdom (UK) explored what level of improvement in academic performance resulted, if any, from the implementation of the physical activity intervention Move4words. McClelland et al. (2014) conducted the study over a four year span trial with 348 pupils in 10 mainstream UK schools. Academic performance was measured for the previous 3 years and during the intervention year for all participants. The intervention group participated in the Move4words program's daily 20-minute interventions implemented at the beginning of the academic year for 12 weeks during normal lessons. Classroom teachers and learning support staff were previously trained in using the Move4words program. The control group did not participate in the Move4words program and followed the regular daily schedule. At the conclusion of the study students in both the intervention groups and control groups took the same national examinations. Seventy-nine percent of students participating in the physical active intervention reached the target score while 66% of students in the control groups reached the target score. McClelland et al. (2014) suggested physical interventions grounded in science can provide viable educational interventions. It was noted that the greatest impact was seen for

students performing below the 20th percentile, yet higher-achieving students achieved smaller but still significant improvements (McClelland et al., 2014).

Extended periods of sedentary behavior within the classroom have been associated with off-task behavior. This study by Goh et al. (2016) was designed to examine the effects of a classroom physical activity intervention, TAKE 10!, on elementary school students' on-task behavior. Two hundred ten students from a large city in Southwestern U.S. participated in systematic direct observations of defined on-task behavior once a week during the first 4 weeks of school to create a baseline. For the next eight weeks students participated daily in TAKE 10! activities. Systematic direct observations of defined on-task behavior were conducted during the last four weeks of the intervention (weeks 9-12). Significant decrease (7.7%) of on-task behavior was observed during the baseline period where students sat for extended time during academic instruction. On-task behavior during the intervention period increased by the same percentage. Additionally, students' on-task behavior increased by 6% from baseline to intervention. The conclusion of the study was that the implementation of physical activity during the school day can help reduce students' off-task behavior (Goh et al., 2016).

A meta-analysis conducted by de Greef et al (2018) provides a systematic review of studies that investigated the effects of physical activity on attention, executive functions and/or academic performance in preadolescent children (6–12 years of age). Relevant studies were examined between the years 2000 and 2017. Thirty-one intervention studies (4,593 children) met the inclusion criteria of the study. Analysis showed that acute physical activity had a positive large effect on attention and a positive small to moderate effect on executive functions as well academic performance (de Greeff et al., 2018). Implications from the study suggest the largest

effects are expected from continuous physical activity interventions conducted over several weeks.

Müller et al (2021) conducted a quantitative study that examined short breaks of physical activity and mindfulness interventions at school affecting students' attention, self-esteem, and reading comprehension. The study involved 162 fourth graders and 79 fifth graders in two elementary schools located in Frankfurt, Germany. An intervention-control group design based on class level was applied with an intervention duration of two weeks with daily 10-minute short breaks in the classrooms. Breaks for both intervention and control groups started at least after 90-minutes of regular school lessons, and sessions were not implemented after regular breaks or after physical education lessons (Müller et al., 2021). The ten minute physical activity break intervention was instructed and consisted of a two minute warm up, four minute intervals of dynamic movements, two minutes of exercises with a partner, and a two minute cooldown. Some of the movements included, but not limited to, running in place, jumping jacks, and invisible jump rope. The control group's ten minute break was not instructed and involved actions that met school regulations for classroom behavior. Attention, reading comprehension, and self-esteem were measured with pretest and posttest assessments. Mindfulness interventions consisted of students looking at soothing images and breathing exercises to be in a relaxed position.

Study results showed physical activities improved children's attention while the mindfulness intervention improved reading comprehension as compared to the controls. It was noted that the positive intervention effect of the physical activity group was only present in participants with low and medium self-esteem. Müller et al (2021) attributed this finding to the

relevance of self-esteem on learning conditions, and that self-esteem could compensate impaired attention.

Effects of Various Types of Physical Activity

To address concern over many children not meeting the physical activity (PA) recommendations along with school policies that are reducing PA opportunities due to budget reductions and increased standardized testing, a study was conducted by Howie et al. (2015). Previously conducted research suggests a positive association between physical activity and academics, but more experimental trials were deemed necessary. This study examined the acute-dose response relationship between various lengths of the implementation of Brain BITES (Better Ideas Through ExerciSe), a classroom PA developed for this study and designed to maintain moderate-to-vigorous aerobic activity for the duration of the PA (Howie et. al., 2015). Ninety-six fourth- and fifth-grade students in 5 South Carolina classrooms participated in the study with 94 completed assessments. A variety of math assessments were used to evaluate math fluency and ability before and after four treatments: 5-minute, 10-minute, or 20-minute PA breaks or 10 min of a sedentary lesson. Various statistical tools were utilized for data analysis. The study found a moderate improvement in math scores for the 10-minute and 20-minute PA interventions compared to math scores from the sedentary lessons.

Another study that was done in 2016 by Schmidt et al. examined the effects of physical exertion through physical activities (PA) on primary school children's attention and cognitive engagement. This study was conducted in Switzerland for three weeks with fifth grade students. The researchers used a 2×2 between-subjects experimental design with 92 children between the ages of 11 and 12 years. Participants were randomly assigned to one of four experimental conditions: (1) combo group (10 minute PA with high cognitive demands), (2) cognition group

(sedentary with high cognitive demands), (3) physical group (10 minute PA with low cognitive demands), and (4) control group (sedentary with low cognitive demands). Assessment of attention using the d2-R test of attention, a paper-and-pencil letter-cancellation test, was performed immediately prior and after the 10 minute intervention. To test whether a potential change in children's attention was mainly due to PE or CE or an interaction of the two, three separate ANCOVAs were conducted (Schmidt et.al., 2016). The ANCOVA data revealed that physical exertion through PA had little to no effect on student attention and that CE was the significant factor in the increased student attention.

Physical activities embedded in academic lessons within school settings to reduce sedentary time spent by students are widely used. Such action has been shown to enhance task engagement, as revealed by observations of attention and behavior control, Time On Task (TOT). Grieco et al (2016) utilized a mixed factorial design study to investigate whether the increase in TOT observed is from the physical activity (PA) or is the result of a break from traditional instruction. The study was also designed to examine what dosage might be needed if the increase in TOT was attributed to PA. Participants were from a school district in Central Texas and included 320 children (7-9 years of age). This study was designed to assess the possibility of a dose response impact of physical activity intensity on the change in TOT. The intervention groups participated in the physically active "spelling relay" lessons compared to control groups that participated in traditional, seated spelling lessons. The study was organized by four conditions: 1) sedentary, standard lesson; 2) sedentary academic game; 3) low to moderate intensity PA (LMPA), academic game and 4) moderate to vigorous intensity PA (MVPA), academic game. Measures included PA via an accelerometer (Grieco et al., 2016). Due to the competitive nature of the PA lessons, a sedentary, competitive lesson was added to address

the possibility that the benefits of these lessons are merely due to the competitive nature not present in traditional instruction. Through mixed-method RMANOVA analysis, TOT decreased following the standard lesson, showed no change following the sedentary academic game, and increased following the LMPA and MVPA academic games. Grieco et al (2016) suggested that future research should further examine dosage of PA and the potential academic benefits of the change in TOT.

In 2017 a study reviewed and evaluated the effect classroom physical activity (PA) had on academic-related outcomes through a systematic review and meta-analysis. Watson et al (2017) conducted their systematic search of various electronic databases in January 2016 and updated them in January 2017. Thirty-nine articles met the inclusion criteria for the review, and 16 provided sufficient data and appropriate design for inclusion in the meta-analyses (Watson et al., 2017). The largest number of studies were conducted in the United States (18), seven in the Netherlands, three in Canada, two in Scotland, and one each in South Africa, Greece, UK, Denmark and Switzerland. Duration of the intervention ranged from a single lesson to three years with the majority lasting no longer than nine weeks (23). The collected data by Watson et al (2017) suggests that classroom-based PA had a positive effect on improving on-task and reducing off-task classroom behavior, and led to improvements in academic achievement when a progress monitoring tool was used. However, no effect was found for cognitive functions or physical activity (Watson et al., 2017).

Physical Activity in Middle Schools

Decline in physical activity (PA) during adolescence has been the topic of research studies. Corder et al (2012) conducted a study to examine decline in PA with regards to different intensities and time periods. The study was conducted over four years assessing PA at three

different points of time: baseline (age 9/10 years); +1 (age 10/11 years); and +4 (age 13/14 years). Three level mixed effects linear regression models were used to model each outcome at the three time points (Corder et al., 2012). Four hundred nine children attending schools in the county of Norfolk, UK completed the four year study with 220 girls and 189 boys. Changes in physical activities investigated were sedentary (SED) time, light (LPA), moderate (MPA) and vigorous (VPA). Results showed an increase in SED of 10.2%. Physical activity decreases were 22.4%, 7%, and 11% for LPA, MPA, and VPA respectively. The study concluded that PA decreases are replaced with increased SED during the earlier adolescent years of British youth and recommended the promotion of at least 10 minutes of PA daily to replace SED as a minimal starting point to offset the decline in PA by British adolescents (Corder et al., 2012).

According to Cairney et al (2014), decline in physical activity (PA) from childhood into later adulthood is most rapid during adolescence. Additionally, the rate of decline in PA between the sexes is also the highest during adolescence. The study by Cairney et al (2014) was conducted to test whether biological maturation can account for sex differences in participation in PA over time from late childhood to early adolescence. Data was used from a longitudinal study conducted by the Physical Health Activity Study Team project, which ran from September 2004 to June 2009. The targeted population was all children enrolled in grade 4 in the Canadian public school system of a large region of Southern Ontario. Baseline data was obtained in September and October 2004 with data collection beginning in the spring of 2005 when the children were approximately 9 years of age and ending in the fall of 2009 when the children were completing grade 9 and approximately 15 years of age. There were 2100 children in the study with 1,064 boys and 1,036 girls. Participation in organized and unstructured PA was used to track participation in PA. Mixed-effects models were used to test whether controlling for

biological age attenuates the effect of chronological age and sex on PA. Results of the study indicated that by age 12 yr, PA participation begins to decline for both sexes. The study also confirmed that the rate of decline in PA participation was greater for girls than boys resulting in a gap that widens over time.

In 2018, WHO (World Health Organization) shared an updated global action plan on physical activity for 2018-2030 with policy actions that promote more active people and a healthier world. A target of a 10% relative reduction of global prevalence of insufficient physical activity by 2025 and 15% relative reduction by 2030 among adolescents and adults was presented (*Let's Be Active*, 2022). The WHO's action plan sets out four objectives and recommends 20 policy actions across multiple sectors to increase physical activity (*Action Plan*, 2022). A study on the adolescent prevalence of insufficient physical activity for the global and national trends from 2001 to 2016 was conducted by Guthold et al. (2019). Data from 298 school-based surveys from 146 countries, territories, and areas including 1.6 million students aged 11–17 years were collected through random sampling with a sample size of at least 100 individuals. More than four in five school going adolescents aged 11–17 years were found insufficiently physically active for 2016 (77.6% of boys and 84.7% of girls). Engagement and responses across multiple sectors are necessary, especially in schools with targeted interventions, to promote and retain physical activity in students aged 11–17 years (Guthold et al., 2019).

Another project, by Sember et al (2020), conducted a longitudinal study on the change in the amount of moderate-to-vigorous physical activity (MVPA) of boys and girls in the early stages of adolescence. Subjects in the study were Slovenian children 11 years of age at the start of the study in October 2013. Participants wore the Bodymedia SenseWear Pro Armband (SWA) for 6 days in October 2013 and October 2016 for analysis of change in the amount of PA. The

SWA device is based on the recognition of energy expenditure patterns and the estimation of physical activity (PA). Several non-invasive biometrical sensors which measure various physical indicators and calculate energy expenditure via algorithms are used by SWA (Sember et al., 2020). The initial sample with sufficient wear time on the required days at age 11 was 141 (boys = 70; girls = 71). The final sample of children at ages 11 and 14 that met the inclusion criteria for both years was 50: 21 boys and 29 girls (Sember et al., 2020). In response to the high exclusion and drop-out that occurred from the first to the second monitoring, the researchers conducted an evaluation to identify any possible exclusion/drop-out bias. A primary finding of the study was a visible decrease in MVPA between the ages of 11 and 14 which was more pronounced in girls. The average decrease of MVPA in girls was 41% compared to boys, who experienced a 7% decrease. This study reinforced results from earlier studies that showed the decline of MPVA in adolescents, but the differences from this study results for boys and girls are more pronounced.

Obstacles to Implementing Physical Activity in Schools

One study examined teacher perceived barriers to the implementation of daily physical activity (DPA) during the school day for Canadian elementary school students (Strampel et al., 2014). It was noted that in 2004 26% of Canadian children aged 2 to 7 years were overweight and 8% were considered obese. In 2006 the Ministry of Health in Ontario, Canada, considering lack of physical activity a preventable cause of childhood obesity, proposed the implementation of a mandatory 20-minute period of DPA within the elementary school curriculum. Strampel et al (2014) investigated what a group of elementary school teachers in Southern Ontario perceive to be the barriers to implementing 20 minutes of DPA within the school day. A 38-item questionnaire was sent to 12 out of 36 approached schools that agreed to participate in the study. Schools were in both rural and urban settings. There were 36 Likert-scale questions and two

open-ended questions. There were 170 questionnaires mailed to teachers in the participating schools, and 137 questionnaires were completed and returned with an 81% participation rate. All respondents were certified elementary school teachers. Data analysis identified four main barriers to regular, quality DPA implementation. These barriers were time and other curriculum pressures, lack of resources, lack of space, and lack of staff and student "buy in."

A mixed-methods designed study was employed to explore classroom teachers' perceptions of using movement in the classroom and what challenges teachers experienced doing so (Benes et al., 2016). Seventeen participants enrolled in the study (15 females, two males) participated in the study where 47%, 24%, and 29% were high school, middle school, and elementary school teachers, respectively. There were three major challenges that surfaced: getting students on board with movement in the classroom, planning for movement, and a lack of exposure on how to use movement in the classroom. What also was interesting to Benes et al (2016) was that teachers in the study expressed their belief that schools should have a role in addressing physical inactivity in youth. It was also identified that the implementation of movement in the classroom is a behavior change for many teachers.

A qualitative study was conducted by Stoecker & Dauenhauer (2020) about the perceptions held by high school teachers and students on the implementation of movement into the classroom. Nine teachers and 20 students (10 seniors, seven juniors, and three sophomores) from two rural high schools in Western United States participated. Three areas of inquiry were presented to the participants through interviews and focus groups. Results from the study suggested that all participants valued the integration of physical activity into the classroom. Teachers felt it could "be beneficial and a valuable teaching tool". Students using a scale of 1 to 10 with 10 being extremely important, rated it 7, 8, or 9. With regards to the second area of

inquiry, the amount of time, teachers preferred five minutes or less while students preferred a longer time of 10 minutes. Both teachers' and students' preferred physical activity method was yoga. Participants indicated that they had limited knowledge of and experience with types of physical activities appropriate for the classroom setting. A more in-depth examination of specific types of physical activities that would be appropriate for secondary students should be considered.

In response to increased examination of school-based implementation of physical activity (PA), a study was conducted by Barcelona et al (2022). This research study investigated classroom teachers' efficacy towards classroom PA with regards to their implementation of D-SHINES (Dearborn School Health through Integrated Nutrition and Exercise Strategies) intervention. D-SHINES, a program dedicated to improving the health of school-aged and early childhood youth and their families in the Dearborn Public Schools district by design cultivates a healthy school culture where teachers, students and families are provided with the resources and knowledge needed to adopt lifelong health habits (*D-SHINES*, 2021). This program works with the district and teachers to provide professional development around PA, quality physical education, and nutrition education.

The study utilized a mixed-method whereby the quantitative data was collected and analyzed through a series of paired sample *t* tests and multiple regressions to investigate the research question, How does the D-SHINES intervention and its provision of classroom PA specific PD influence teacher self-efficacy toward PA? (Barcelona et al., 2022). Correlational analysis and 2 multiple regressions were conducted to qualitatively investigate the research question, How does teachers' efficacy toward implementing classroom PA influence how often PA opportunities are provided in the classroom? (Barcelona et al., 2022). The qualitative data

utilized the quantitative data to inform the qualitative analysis. Interview questions were guided by specific attributes of teacher efficacy identified in the quantitative examination. Barcelona et al. (2022) suggested professional development in facilitating PA in the classroom resulted in increased teacher efficacy. Increased teacher efficacy was a significant predictor of the amount of PA implemented in the classroom.

Conclusion

As school-age students are experiencing decreased time engaged in physical activity, research has identified numerous benefits of classroom-based physical activity. Through reviewing research on physical activity within the classroom, it can be concluded that it would be prudent for schools to support the implementation of classroom-based physical activity. This school improvement plan focuses on facilitating staff at Oak View Middle School in their efforts to implement physical activity within content instruction.

School Profile

Oak View Middle School (OVMS) is part of the Anoka-Hennepin School District ISD #11. The Anoka-Hennepin School District (AHS) is Minnesota's largest, serving approximately 38,000 students. The district is made of 13 suburban communities north of the Twin Cities of Minneapolis and St. Paul. Anoka-Hennepin has 26 elementary schools, six middle schools (grades six through eight), and five traditional high schools, plus alternative middle and high school sites, in addition to a Community Education program. The school district ranks in the top 20% in the state of Minnesota for overall rank and math proficiency (*Anoka-Hennepin Public School District (2022) | Andover, MN, 2022*). It is the primary mission of the Anoka-Hennepin School District to effectively educate each of its students for success and the stated vision for the

district is to be a public school system of excellence, with high quality staff and programs and successful graduates (*Overview / Overview, 2022*).

OVMS is located in Andover, MN and opened in the school year 1996-1997 with an enrollment of 950 students. Current enrollment at OVMS is about 1,300 students, and its students come from three different elementary schools. Most OVMS students attend Andover High School. OVMS demographics are 87% Caucasian and 13% minority, with almost all of the 13% identifying as African American or Hispanic. OVMS has 14% of its student population on free and reduced lunch. OVMS has one head principal and three assistant principals who are each assigned to one of the three grade levels, along with three school counselors also assigned to a specific grade level (*About Our School / Overview, 2021*.).

There is a strong track record of support and involvement from OVMS families. Almost 90% of the student body attend school on a consistent basis and are not frequently absent compared to the statewide average of 85% (*Minnesota Report Card, 2022*). Nearly 20% of students have an adult family member volunteer at least once during their years at OVMS.

OVMS is known for its excellence in the arts and academics. OVMS prides itself on preparing its students for future success through a wide range of academic course offerings with engaging activities and lessons to help students find their passions and then build on them. OVMS has a mission statement saying the administrative team and entire school staff will have the needs of students and their learning at the forefront and center of all decisions made (*About Our School / Overview, 2021*).

Anoka-Hennepin middle school students outpaced 2021 state average scores in math, reading and science on the Minnesota Comprehensive Assessment (MCA) tests by 8.1 percent, 5.6 percent, and 16.6 percent respectively (*Anoka-Hennepin Students Show Strong Results on*

State MCA Math, Reading and Science Tests, 2021). Students from OVMS continued to demonstrate high academic achievement by outperforming the district's scores by exceeding the state average scores in math, reading, and science on the MCA tests by 13.6 percent, 7.7 percent, and 18 percent respectively (*Minnesota Report Card*, 2022.).

OVMS assessments and grading vary depending on the content area being taught. AHS is in the process of changing from the traditional grading method to standards-based grading. In the 2019-2020 school year mathematics, health, and physical education subjects began the process by piloting standards-based grading (*Curriculum, Instruction and Assessment Department / Secondary Standards-Based Reporting*, 2019.). It is the district's plan to have all content areas aligned with the Minnesota Department of Education Standards and using standards-based grading by the 2023-2024 school year. "This standards-based reporting system focuses on student learning rather than the earning of points or a single grade based on an overall average. In a standards-based classroom, student work is evaluated as evidence of learning, and teachers and students use established criteria to determine what level of learning is evident from the student work" (*Curriculum, Instruction and Assessment Department / Secondary Standards-Based Reporting*, 2019). The goal throughout the district is to have classroom assessments be meaningful to students and be an accurate portrayal of where students are in mastering content and the standards.

OVMS has a strong connection with both the elementary and high school in Andover. Andover Elementary School and Andover High School are both less than two miles from OVMS. This strong connection is present for many reasons, in particular staff members being connected professionally to multiple buildings. Some staff members teach in multiple buildings as well as being involved in student extracurricular activities in another building.

Anoka-Hennepin as a district places a strong emphasis on professional development for staff. Opportunities and encouragement to continue to develop, grow, and improve as educators and leaders exist throughout the district. Within the weekly work schedule the district has dedicated collaborative time for teachers within their department to discuss curriculum, lessons, activities, and other pertinent information for the classroom and students. OVMS specifically has 30 minutes a week allocated strictly for professional learning community meetings for departments and staff to use how they feel best.

Needs Assessment

The Minnesota Department of Education (MDE) works jointly with the Minnesota Department of Health (MDH) to identify strategies and provide resources to increase physical activity (PA) opportunities for Minnesota students. The Active Schools Minnesota Initiative was established through this collaboration, which focused on (PA) as an important ingredient for health and academic success. The study, conducted from 2014 through 2016 in 14 elementary schools, recognized the potential to affect students' level of physical inactivity by including periods of (PA) into students' academic (*Enhancing Physical Activity Practices in 14 Elementary Schools AN EVALUATION OF THE STATEWIDE HEALTH IMPROVEMENT PARTNERSHIP (SHIP) ACTIVE SCHOOLS MINNESOTA INITIATIVE*. 2017).

The Anoka-Hennepin School District (AHS) conducts a review of its Wellness Policy every three years. It recognizes the evidence-based link between health wellness and improved educational outcomes of AHS students. AHS Wellness Policy was first adopted in 2006 and most recently updated May 23, 2022. Under the curriculum section the policy includes three guidelines for integrating PA into the classroom setting. These guidelines are:

1. Classroom teachers are encouraged to develop opportunities for physical activity that can be incorporated into subject lessons and are encouraged to provide short physical activity breaks during class.

2. Staff is encouraged to model physical activity.

3. Staff is encouraged to find creative ways to promote physical activity before, during and after the school day. (*Anoka-Hennepin Wellness Policy Comment and Feedback Opportunity*, 2022).

Students at Oak View Middle School (OVMS) need to be physically active throughout their daily schedule. OVMS students attend school for seven 46-minute periods. Current scheduling of physical education instruction does not provide the daily recommended amount of 60 minutes of moderate-to-vigorous physical activity for OVMS students. The implementation of PA within classroom lessons will present more opportunities for students to be active and move closer to meeting the daily recommended time of PA. In addition, this school improvement plan is in alignment with the AHS Wellness Plan guidelines in providing short physical activity breaks during class.

Data Analysis

In 1989, the Minnesota Department of Education (MDE) developed a voluntary survey of Minnesota students for specific grade levels that monitored students' risk and protective behaviors. The survey, administered on a three year cycle, most recently published responses for 2019. One survey question asked about the number of days a student was physically active for at least 60 minutes over a seven day period. The data results (table 1) for Anoka-Hennepin School District (AHS) fifth and eighth grade students were 51.5% and 52% physically active for a minimum of 60 minutes five or more days, respectively. Results for students responding for two

or fewer days of being physically active for a minimum of 60 minutes were 24.9% and 21.7% of fifth and eighth grade students, respectively (*Data Reports and Analytics*, 2022).

Table 1

Physical Activity/Exercise

During the last 7 days, on how many days were you physically active for a total of at least 60 minutes per day?

Responses	5th grade count	5th grade percentage	8th grade count	8th grade percentage
0 day	185	7.5	177	7.2
1 day	176	7.2	144	5.9
2 days	250	10.2	212	8.6
3 days	302	12.3	290	11.8
4 days	352	14.3	355	14.5
5 days	360	14.6	454	18.5
6 days	242	9.8	275	11.2
7 days	593	24.1	546	22.3
Total responses	2,260		2,453	

Additionally, in this survey, students were questioned with regards to participation in activities outside of the school day that were physically active. With regards to participation in sports teams, 47.5% and 44.7% of fifth and eighth grade students, respectively, answered zero days. Responses from fifth and eighth grade students about participating in physical activity lessons, 77.9% and 78.8%, respectively, answered zero days (*Data Reports and Analytics*, 2022).

Oak View Middle School (OVMS) daily schedule consists of seven 46-minute periods plus a 30-minute lunch period and a 22-minute PRIDE (homeroom) period that is at the start of

the school day. Information in table 2 outlines physical education (PE) class requirements and options for OVMS students per AHS middle school programming.

Table 2

Grade level	Required/Elective	Elective options
6th grade students	PE class required every other day	Students rotate every other day with a music course option (band, choir, orchestra).
7th grade students	PE class elective every other day	Students choose 2 courses from a PA course (PE class or fitness class), a music course option, or art that rotate every other day.
8th grade students	PE class elective every other day or daily	In addition to the same options as 7th grade students, students may choose a daily PE class.

The Active Schools Minnesota Initiative’s Pilot Study examined classroom strategies to increase physical activity (PA) during and outside the school day in 14 elementary schools. These strategies were shown to have a positive impact on increasing the opportunities for physical activity before, during and after school. Staff participating in the study reported on their implementation of best practices that aligned with strategies to increase PA in the classroom. Data on active classroom best practices are presented in Appendix A. Two best practices relevant to this school improvement plan are “Classroom teachers receive professional development on active classrooms” and “Classroom teachers share physical activity resources with each other”. Seventy-two teachers in 11 elementary schools reported full implementation of these two best practices 26% and 19%, respectively (*Enhancing Physical Activity Practices in 14 Elementary Schools an EVALUATION of the STATEWIDE HEALTH IMPROVEMENT PARTNERSHIP (SHIP) ACTIVE SCHOOLS MINNESOTA INITIATIVE*, 2017). To date, there is not a similar study initiated in the middle school setting. However, the need for middle school

staff professional development and the sharing of resources among staff with regards to physical activity in the classroom exists.

Increasing opportunities for PA within the school day through active lessons and physical breaks would assist AHS middle school students and specifically at OVMS in meeting the minimum of 60-minutes of daily PA. This school improvement plan will present staff collaboration and resources to implement PA within the OVMS school day.

Action Plan

Research has shown a significant drop in physical activity levels as students age as well as an increase in sedentary behavior (Katzmarzyk et al., 2018). The focus of this action plan is to create opportunities for students of Oak View Middle School (OVMS) to engage in physical activity (PA) during classroom instruction. Increasing the amounts of minutes students engage in PA during the school day will facilitate their meeting the daily recommended amount of 60 minutes of moderate-to-vigorous physical activity. Additionally, regular PA supports physical fitness and can play a significant role in promoting children's mental and cognitive health (*SHAPE of the NATION™ 2*, 2016).

Staff at all school levels need professional development (PD) on integrating PA into classrooms. According to the School Health Policies and Practices Study conducted by the CDC (Centers for Disease Control and Prevention) in 2014, only 37% of classroom teachers received PD on the integration of PA into their classrooms. As school levels increase, the percentages decrease. As per the study, only 42%, 25%, and 19% of elementary, middle, and high school teachers, respectively, are experiencing this PD (*Classroom Physical Activity*, 2019).

The CDC outlined 10 evidence-based strategies for implementation of classroom PA in its 2018 *Strategies for Classroom Physical Activities in School* (*Classroom Physical Activity*,

2019). These 10 strategies presented in Appendix B are grouped under the following three categories:

1. Build buy-in and provide training for classroom physical activity.
2. Create classroom environments supportive of physical activity.
3. Collect and share information about classroom physical activity experiences. (*Strategies for Classroom Physical Activity in Schools Strategies for Classroom Physical Activity in Schools 2*, 2018).

The strategies within these three categories will be the foundation for this action plan as the goal is to increase the minutes of PA within the classroom for OVMS students.

The school improvement plan will occur during the 2022-2023 school year. It will provide information to the OVMS staff on the benefits of PA within the classroom as well as PD on integrating PA in academic learning experiences across content areas. Resources for implementing PA as part of curricular activities and daily lessons will be shared with staff along with ongoing support in the utilization of these resources. In addition, collaborative time will be designated for teams to work on implementing and evaluating PA within their classrooms.

Assessment and evaluation of the resources and implementation of strategies will be ongoing. Periodic staff and student surveys will be used as well as a year-end assessment survey. Modifications, additions, and support will be developed based upon input from surveys and input from collaboration among staff meetings.

Implementation of School Improvement Plan

Classroom physical activity (PA) creates opportunity for students to engage in PA during the school day in addition to physical education classes. Two primary approaches for PA are integration to planned lessons in content areas along with physical breaks outside of academic

instruction (*Integrate Classroom Physical Activity in Schools: A Guide for Putting Strategies into Practice* *Integrate Classroom Physical Activity in Schools: A Guide for Putting Strategies into Practice*, 2018). According to a study conducted by Barcelona et al. (2022), professional development (PD) in implementation of PA in the classroom results in increased teacher efficacy, which was shown to be a significant predictor of the amount of PA implemented in the classroom.

The goal of this school improvement plan (SIP) is to increase the minutes Oak View Middle School (OVMS) students are physically active within the school day. Through planned PA as part of academic instruction as well as physical breaks within the classroom, an increase in student PA minutes along with improved student behavior and academic performance are projected. With PD and collaborative opportunities along with resources to implement PA, teacher efficacy will be enhanced.

The introduction of the school improvement plan during workshop week (August 29-September 1, 2022) will establish the need and benefits of integrating physical activity daily within the classroom and academic lessons. OVMS staff will participate in a survey at the start of the workshop to determine their knowledge of integrating PA within the classroom along with identifying current practice of such. The staff will revisit the survey throughout the school year to identify new learning and skills being developed. Activities will include modeling various PA activities during the workshop presentation. The proposed timeline for implementation and on-going evaluation will also be reviewed during .

Implementation of the SIP during the school year is outlined in Table 3. Staff will collaborate within their PLC groups on September 19th, two weeks after the introduction of PA during workshop week. The October 17th PLC meeting will be designated for collaborative time

for teams after six weeks of implementation. Thereafter, one weekly PLC meeting each month will be time for staff collaboration on implementing PA into their classrooms.

Staff and student surveys will occur before each of the two building PD days where time to discuss and share progress on PA will be allotted into that day's schedule. Time for building discussion of the initial implementation of physical activity within the classroom lessons will occur on November 8th. Modifications, additions, and support would be developed based upon input from this collaborative time and surveys. This will occur again for the PD day on April 7, 2023 to focus on the continued use of physical activity within classroom lessons. A year-end survey for both staff and students would be created and administered prior to June 8, 2023 for evaluation of the SIP for consideration to the following school year.

Table 3

Implementation of SIP During School Year

Date	Participants	Focus
September 19, 2022 PLC	PLC (professional learning community) Teams	Collaboration on implementing PA within classroom
October 17, 2022 PLC	PLC Teams	Collaboration on implementing PA within classroom
October 26 through November 2, 2022	OVMS staff	Online progress survey
November 8, 2022	OVMS staff	Building PD day-staff discussion and share-out of PA.
One December PLC	PLC Teams	Collaboration on implementing PA within classroom
One January PLC	PLC Teams	Collaboration on implementing PA within classroom
One February PLC	PLC Teams	Collaboration on implementing PA within classroom

One March PLC	PLC Teams	Collaboration on implementing PA within classroom
March 27 through April 3, 2023	OVMS staff	Online progress survey
April 7, 2023	OVMS staff	Building PD day-staff discussion and share-out of PA.
One April PLC	PLC Teams	Collaboration on implementing PA within classroom
One May PLC	PLC Teams	Collaboration on implementing PA within classroom
May 30 through June 5, 2023	OVMS staff	Online evaluation survey

Resources and materials for implementing PA in classroom settings will be shared with staff during workshop week along with participation in hands-on PA activities. Links to online material that is user friendly and ready for classroom use along with printed materials will be maintained through Google Shared Drive. This format will be used for ongoing updates and sharing of new materials and resources. Google Forms will be created and accessible for staff to use for student surveys. Google Docs will provide examples of materials to guide collaborative time for PLC teams. Appendix C presents materials focused on school-based PA and movement.

All OVMS staff will be responsible to engage their students in PA within their classroom during the 2022-2023 school year. Department heads will facilitate the monthly PLC meetings and coordinate materials and information for their team members. Appendix D provides a template that can be used to guide PLC collaboration. They will also participate along with the author of the SIP and administrators in evaluating survey responses. OVMS administration will support and facilitate staff's implementation of PA within their classrooms as well as designate time for PD opportunities.

Data from surveys administered during the year to staff and students will be organized and reviewed. Additionally, collaborative and share-out sessions on PD days will be evaluated and used to guide modifications and additions to resources and support from administration. Feedback from department teams regarding PLC meetings will also provide data on the implementation of PA within the classrooms of OVMS.

In the current climate of being a teacher there does not seem to be enough hours in the school day to cover everything that needs and is expected to be done. The idea of adding something more to a classroom teacher's plate, no matter the importance or benefit, may create a stressful situation. Various research studies have identified barriers to the implementation of PA in the classroom. According to Strampel et al (2014), time and curriculum pressures, lack of resources, lack of space, and lack of staff and student "buy in" were identified as four main barriers. Benes et al (2016) further identified the lack of exposure on how to use movement in the classroom as an additional major barrier. This SIP will address these barriers through collaborative time, PD sessions, and support with materials and resources.

Conclusion

Due to the increased emphasis on academic achievement placed upon school-age children, the amount of the physical activity (PA) they experience has come under scrutiny. Studies have shown decline in PA and furthermore, students' engagement in sedentary behavior has been increasing (Corder et al., 2012).

Students across all grade levels are finding it challenging to meet the recommended amount of 60 minutes of daily moderate-to-vigorous PA. In addition, research has established that the amount of time students engage in PA during the school day decreases as they move from elementary into secondary school settings (Katzmarzyk et al., 2018). This school

improvement plan (SIP) addresses the concern over the high percentage of middle school students that do not meet the recommended amount of 60 minutes of daily moderate-to-vigorous PA.

Oak View Middle School's (OVMS) implementation of classroom-based PA will provide opportunities to move towards meeting the recommended PA minutes for our students. Research has shown that the time spent implementing PA within the classroom will not only increase students' daily physical active minutes but also positively impact their academic performance and behavior (Álvarez-Bueno et al., 2017). To be successful in this endeavor, appropriate professional development for OVMS staff is necessary.

The PD in this SIP focuses on active learning alongside collaboration with peers and the modeling of best practices. This PD and support from administration will facilitate OVMS staff's efficacy in providing PA opportunities for our students. They will benefit from the SIP through increased daily minutes engaged in PA along with improved behavior and academic learning. Achieving positive results from the implementation of this SIP in the 2022-2023 school year will promote further development of classroom PA opportunities in future years at OVMS.

References

- About our school / Overview.* (2021). Wwww.ahschools.us. Retrieved June 25, 2022, from <https://www.ahschools.us/domain/2177>
- Action plan.* (2022). Wwww.who.int.<https://www.who.int/news-room/initiatives/gappa/action-plan>
- Álvarez-Bueno, C., Pesce, C., Caverro-Redondo, I., Sánchez-López, M., Garrido-Miguel, M., & Martínez-Vizcaíno, V. (2017). Academic Achievement and Physical Activity: A Meta-analysis. *Pediatrics*, 140(6), e20171498. <https://doi.org/10.1542/peds.2017-1498>
- Anoka-Hennepin Public School District (2022) | Andover, MN.* (2022). Wwww.publicschoolreview.com. Retrieved June 25, 2022, from <https://www.publicschoolreview.com/minnesota/anoka-hennepin-public-school-district/2703180-school-district>
- Anoka-Hennepin students show strong results on state MCA math, reading and science tests.* (2021). Wwww.ahschools.us. Retrieved June 26, 2022, from <https://www.ahschools.us/site/Default.aspx?PageType=3&DomainID=4&PageID=1&ViewID=047e6be3-6d87-4130-8424-d8e4e9ed6c2a&FlexDataID=53141>
- Anoka-Hennepin Wellness Policy comment and feedback opportunity.* 2022. Wwww.ahschools.us. Retrieved July 12, 2022, from <https://www.ahschools.us/site/Default.aspx?PageType=3&DomainID=7638&PageID=44960&ViewID=6446ee88-d30c-497e-9316-3f8874b3e108&FlexDataID=71650>
- Barcelona, J. M., Centeio, E. E., Hijazi, K., & Pedder, C. (2022). Classroom Teacher Efficacy Toward Implementation of Physical Activity in the D-SHINES Intervention. *Journal of School Health*, 92(6), 619–628. <https://doi.org/10.1111/josh.13163>

- Benes, S., Finn, K. E., Sullivan, E. C., & Yan, Z. (2016). Teachers' Perceptions of Using Movement in the Classroom. *The Physical Educator*, 73(1). <https://doi.org/10.18666/tpe-2016-v73-i1-5316>
- Cairney, J., Veldhuizen, S., Kwan, M., Hay, J., & Faught, B. E. (2014). Biological Age and Sex-Related Declines in Physical Activity during Adolescence. *Medicine & Science in Sports & Exercise*, 46(4), 730–735. <https://doi.org/10.1249/mss.0000000000000168>
- Carlson, J. A., Engelberg, J. K., Cain, K. L., Conway, T. L., Mignano, A. M., Bonilla, E. A., Geremia, C., & Sallis, J. F. (2015). Implementing classroom physical activity breaks: Associations with student physical activity and classroom behavior. *Preventive Medicine*, 81, 67–72. <https://doi.org/10.1016/j.ypmed.2015.08.006>
- Chaput, J.-P., Willumsen, J., Bull, F., Chou, R., Ekelund, U., Firth, J., Jago, R., Ortega, F. B., & Katzmarzyk, P. T. (2020). 2020 WHO guidelines on physical activity and sedentary behaviour for children and adolescents aged 5–17 years: summary of the evidence. *International Journal of Behavioral Nutrition and Physical Activity*, 17(1). <https://doi.org/10.1186/s12966-020-01037-z>
- Classroom Physical Activity*. (2019). Centers for Disease Control and Prevention. <https://www.cdc.gov/healthyschools/physicalactivity/classroom-pa.htm>
- Corder, K., Sharp, S., Griffin, S., Jones, A., Ekelund, U., & van Sluijs, E. (2012). Change in objectively measured physical activity during the transition to adolescence: Targets for intervention. *Journal of Science and Medicine in Sport*, 15, S252. <https://doi.org/10.1016/j.jsams.2012.11.612>

Curriculum, instruction and assessment department / Secondary standards-based reporting.

(2019. Wwww.ahschools.us. Retrieved June 27, 2022, from

<https://www.ahschools.us/Page/43108>

Data Reports and Analytics. (2022). Public.education.mn.gov.

<https://public.education.mn.gov/MDEAnalytics/DataTopic.jsp?TOPICID=242>

de Greeff, J. W., Bosker, R. J., Oosterlaan, J., Visscher, C., & Hartman, E. (2018). Effects of physical activity on executive functions, attention and academic performance in preadolescent children: a meta-analysis. *Journal of Science and Medicine in Sport*, 21(5), 501–507. <https://doi.org/10.1016/j.jsams.2017.09.595>

D-SHINES. (2021). D-SHINES. Retrieved July 1, 2022, from <https://www.dshines.org/>

Enhancing Physical Activity Practices in 14 Elementary Schools AN EVALUATION OF THE STATEWIDE HEALTH IMPROVEMENT PARTNERSHIP (SHIP) ACTIVE SCHOOLS MINNESOTA INITIATIVE. (2017).

Goh, T. L. (2017). Children’s Physical Activity and On-Task Behavior Following Active Academic Lessons. *Quest*, 69(2), 177–186.

<https://doi.org/10.1080/00336297.2017.1290533>

Goh, T. L., Fu, Y., Brusseau, T., & Hannon, J. (2018). On-task behavior of elementary students during movement integration. *Journal of Physical Education and Sport*, 18(1), 103-106.

<https://doi-org.ezproxy.nwciowa.edu/10.7752/jpes.2018.01013>

Goh, T. L., Hannon, J., Webster, C., Podlog, L., & Newton, M. (2016). Effects of a TAKE 10! Classroom-Based Physical Activity Intervention on Third- to Fifth-Grade Children’s On-task Behavior. *Journal of Physical Activity and Health*, 13(7), 712–718.

<https://doi.org/10.1123/jpah.2015-0238>

- Grieco, L. A., Jowers, E. M., Errisuriz, V. L., & Bartholomew, J. B. (2016). Physically active vs. sedentary academic lessons: A dose response study for elementary student time on task. *Preventive Medicine*, 89, 98–103. <https://doi.org/10.1016/j.ypmed.2016.05.021>
- Guthold, R., Moller, A.-B., Azzopardi, P., Ba, M. G., Fagan, L., Baltag, V., Say, L., Banerjee, A., & Diaz, T. (2019). The Global Action for Measurement of Adolescent Health (GAMA) Initiative—Rethinking Adolescent Metrics. *Journal of Adolescent Health*, 64(6), 697–699. <https://doi.org/10.1016/j.jadohealth.2019.03.008>
- Howie, E. K., Schatz, J., & Pate, R. R. (2015). Acute Effects of Classroom Exercise Breaks on Executive Function and Math Performance: A Dose–Response Study. *Research Quarterly for Exercise and Sport*, 86(3), 217–224. <https://doi.org/10.1080/02701367.2015.1039892>
- Integrate Classroom Physical Activity in Schools: A Guide for Putting Strategies Into Practice*. (2018). https://www.cdc.gov/healthyschools/physicalactivity/pdf/Guide_for_Classroom_PA_508.pdf
- Katzmarzyk, P. T., Denstel, K. D., Beals, K., Carlson, J., Crouter, S. E., McKenzie, T. L., Pate, R. R., Sisson, S. B., Staiano, A. E., Stanish, H., Ward, D. S., Whitt-Glover, M., & Wright, C. (2018). Results from the United States 2018 Report Card on Physical Activity for Children and Youth. *Journal of Physical Activity and Health*, 15(s2), S422–S424. <https://doi.org/10.1123/jpah.2018-0476>
- Let's be active*. (2022). Wwww.who.int. <https://www.who.int/news-room/initiatives/gappa>

- Mavilidi, M. F., Lubans, D. R., Miller, A., Eather, N., Morgan, P. J., Lonsdale, C., Noetel, M., Karayanidis, F., Shaw, K., & Riley, N. (2020). Impact of the "Thinking while Moving in English" intervention on primary school children's academic outcomes and physical activity: A cluster randomised controlled trial. *International Journal of Educational Research*, 102, 101592. <https://doi.org/10.1016/j.ijer.2020.101592>
- Mavilidi, M. F., Lubans, D. R., Morgan, P. J., Miller, A., Eather, N., Karayanidis, F., Lonsdale, C., Noetel, M., Shaw, K., & Riley, N. (2019). Integrating physical activity into the primary school curriculum: rationale and study protocol for the "Thinking while Moving in English" cluster randomized controlled trial. *BMC Public Health*, 19(1). <https://doi.org/10.1186/s12889-019-6635-2>
- McClelland, E., Pitt, A., & Stein, J. (2014). Enhanced academic performance using a novel classroom physical activity intervention to increase awareness, attention and self-control: Putting embodied cognition into practice. *Improving Schools*, 18(1), 83–100. <https://doi.org/10.1177/1365480214562125>
- Minnesota Report Card. (2022). Minnesota Report Card. Retrieved June 25, 2022, from https://rc.education.mn.gov/#mySchool/orgId--10011193000__p--3
- Müller, C., Otto, B., Sawitzki, V., Kanagalingam, P., Scherer, J.-S., & Lindberg, S. (2021). Short breaks at school: effects of a physical activity and a mindfulness intervention on children's attention, reading comprehension and self-esteem. *Trends in Neuroscience and Education*, 100160. <https://doi.org/10.1016/j.tine.2021.100160>

Nagata, J. M., Cortez, C. A., Dooley, E. E., Iyer, P., Ganson, K. T., & Pettee Gabriel, K. (2022).

Moderate-to-vigorous intensity physical activity among adolescents in the USA during the COVID-19 pandemic. *Preventive Medicine Reports*, 25, 101685.

<https://doi.org/10.1016/j.pmedr.2021.101685>

Okely, A. D., Kontsevaya, A., Ng, J., & Abdeta, C. (2021). 2020 WHO guidelines on physical activity and sedentary behavior. *Sports Medicine and Health Science*.

<https://doi.org/10.1016/j.smhs.2021.05.001>

Overview / Overview. (2022). Wwww.ahschools.us. Retrieved June 25, 2022, from

<https://www.ahschools.us/domain/74#:~:text=Mission%20statement>

Physical Activity Guidelines for Americans Midcourse Report Strategies to Increase Physical

Activity Among Youth. (2012). <https://health.gov/sites/default/files/2019-09/pag-mid-course-report-final.pdf>

Rosenkranz, R. R., Neuendorf, C. M., Rosenkranz, S. K., & Sauer, K. L. (2020). Just Sit Still and Pay Attention?—A Commentary. *Journal of School Health*.

<https://doi.org/10.1111/josh.12881>

Schmidt, M., Benzing, V., & Kamer, M. (2016). Classroom-Based Physical Activity Breaks and Children's Attention: Cognitive Engagement Works! *Frontiers in Psychology*, 7.

<https://doi.org/10.3389/fpsyg.2016.01474>

Sember, V., Jurak, G., Kovač, M., Đurić, S., & Starc, G. (2020). Decline of physical activity in early adolescence: A 3-year cohort study. *PLOS ONE*, 15(3), e0229305.

<https://doi.org/10.1371/journal.pone.0229305>

- SHAPE OF THE NATION*TM 2. (2016). https://www.shapeamerica.org/uploads/pdfs/son/Shape-of-the-Nation-2016_web.pdf
- Stapp, A. C. (2018). Effect of Recess on Fifth Grade Students Time On-Task in an Elementary Classroom. *International Electronic Journal of Elementary Education*, 10(4), 449–456. <https://doi.org/10.26822/iejee.2018438135>
- Stoepker, P., & Dauenhauer, B. (2020). Secondary Student and Teacher Perceptions of Classroom Physical Activity. *The Physical Educator*, 77(5). <https://doi.org/10.18666/tpe-2020-v77-i5-10108>
- Strampel, C. M., Martin, L., Johnson, M. J., Iancu, H., Babineau, C., & Carpenter, J. G. (2014). Teacher Perceived Barriers and Potential Solutions to Implementing Daily Physical Activity in Elementary Schools. *Physical & Health Education Journal*, 80(1), 14-22. <http://ezproxy.nwciowa.edu/login?url=https://www-proquest-com.ezproxy.nwciowa.edu/scholarly-journals/teacher-perceived-barriers-potential-solutions/docview/1637040871/se-2?accountid=28306>
- Strategies for Classroom Physical Activity in Schools* Strategies for Classroom Physical Activity in Schools 2. (2018). https://www.cdc.gov/healthyschools/physicalactivity/pdf/2019_04_25_Strategies-for-CPA_508tagged.pdf
- Tomprowski, P. D., McCullick, B., Pendleton, D. M., & Pesce, C. (2015). Exercise and children's cognition: The role of exercise characteristics and a place for metacognition. *Journal of Sport and Health Science*, 4(1), 47–55. <https://doi.org/10.1016/j.jshs.2014.09.003>

Troiano, R. (2016). *Physical Activity Guidelines for Americans History of Physical Activity Recommendations and Guidelines for Americans.*

<https://health.gov/sites/default/files/2019-11/History-of-Physical-Activity-Recommendations-and-Guidelines-for-Americans.pdf>

Watson, A., Timperio, A., Brown, H., Best, K., & Hesketh, K. D. (2017). Effect of classroom-based physical activity interventions on academic and physical activity outcomes: a systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity*, 14(1). <https://doi.org/10.1186/s12966-017-0569-9>

Appendix A

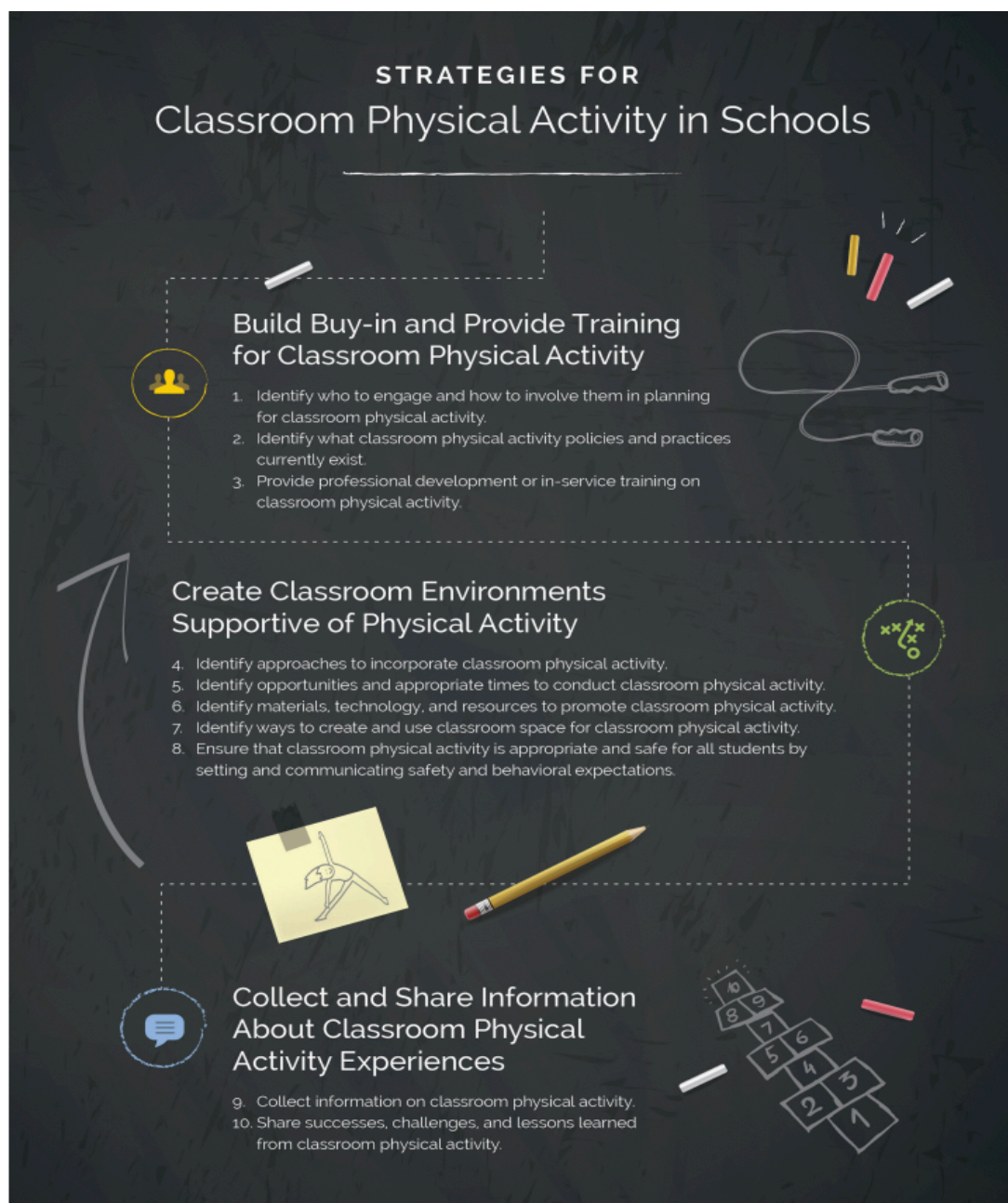
ENHANCING PHYSICAL ACTIVITY PRACTICES
IN 14 ELEMENTARY SCHOOLS**Table A2. Active Classrooms Best Practices**

Best Practice	Percent Reporting Full Implementation*
Physical Education teacher or other staff provide resources for classroom movement	50%
Classroom teachers provide rationale to students why moving is important	47%
Classroom uses internet sites such as GoNoodle or Jammin Minute	35%
Classroom teachers receive professional development on active classrooms	26%
Classroom provides both morning and afternoon physical activity times	39%
Classroom teachers use music to get students moving in the classroom	36%
Classroom teachers share physical activity resources with each other	19%
Classroom utilizes student leaders to select and/or lead activities	7%
Classroom environment furnished with equipment such as stability balls or standing desks	6%
Classroom utilizes resources in print form such as the North Carolina Energizers	3%
Classroom environment furnished with equipment such as stability balls or standing desks	6%

*Based on reports by 72 teachers in the 11 schools that implemented the active classrooms strategy.

(Enhancing Physical Activity Practices in 14 Elementary Schools an EVALUATION of the STATEWIDE HEALTH IMPROVEMENT PARTNERSHIP (SHIP) ACTIVE SCHOOLS MINNESOTA INITIATIVE, 2017)

Appendix B



(*Strategies for Classroom Physical Activity in Schools Strategies for Classroom Physical Activity in Schools 2*, 2018).

Appendix C

Physical activity resources

Resource	Description	Link
SHAPE (Society of Health and Physical Educators) America	Platform supporting physical activity for children and youth.	https://www.shapeamerica.org/explorePA.aspx
Springboard to Active Schools	Platform providing resources to implement physical activity into student learning.	https://schoolspringboard.org/resources/webinar-tools-and-ideas-for-engaging-students-through-active-learning/
Movement Matters	Active Schools Minnesota toolkit of strategies to assist schools with increasing students' physical activity during and outside school.	https://www.health.state.mn.us/communities/physicalactivity/docs/movingmatters.pdf
Brain Gym	Kinesthetic movements that activate the brain for learning readiness.	https://www.wecarewebbridge.com/pdf/Brain%20Gym.pdf
Classroom in Motion	Resource to assist classroom teachers in offering physical activity opportunities to students.	https://classroomsinmotion.com/
Move to Learn	23 videos, approximately 5 minutes for moderate physical activity done in the classroom.	https://www.youtube.com/playlist?list=PLpOWrwo3Chz9pPzAnAVayV3ZRRaA-w74h
Well Ahead Louisiana-Secondary classroom physical activity	Activities to get students moving with tips and lesson integration ideas for older students.	https://wellaheadla.com/wp-content/uploads/2021/03/Physical-Activity-Ideas-with-Secondary-Students.pdf
OPEN (Online Physical Education Network)	Classroom physical activity boosting movement videos and activity cards.	https://openphysed.org/activeclassnow
The Inspired Educator	Movement in the Classroom: 50 Easy-to-Use Ideas	http://the-inspired-educator.com/movement-in-the-classroom-50-easy-to-use-ideas/
Edutopia	"More Than a Dozen Ways to Build Movement Into Learning"	https://www.edutopia.org/article/more-dozen-ways-build-movement-learning
The Colorado Education Initiative	Take a Break! Teacher Toolbox Physical Activity Breaks in the Secondary Classroom	https://www.coloradoedinitiative.org/wp-content/uploads/2014/08/CEI-Take-a-Break-Teacher-Toolbox.pdf

Appendix D



Classroom Physical Activity Planning Template

What activities can be used to adopt, promote, enhance, and sustain classroom physical activity?					
APPROACHES TO INTEGRATE ACTIVITIES (Strategy 4)	NAME & DESCRIPTION OF ACTIVITIES	APPROPRIATE TIME FOR ACTIVITIES (Strategy 5)	EQUIPMENT, TECHNOLOGY, & RESOURCES REQUIRED (Strategy 6)	SPACE REQUIREMENTS (Strategy 7)	SAFETY, BEHAVIORAL, & INCLUSION CONSIDERATIONS (Strategy 8)
EXAMPLE: Activities to integrate physical activity into planned academic instruction	TOSS AND CATCH: Partners toss an object back and forth for each letter of a spelling word until the word is spelled out	After lunch at the start of the spelling lesson	Any soft object	Pairs can spread out and throw an object across desks, in the aisle, or around a reading circle	To accommodate different levels of skill and abilities, student pairs can choose to either stand or sit while tossing an object
Activities to integrate physical activity into planned academic instruction					
Activities to integrate physical activity outside of planned academic instruction					
Activities to re-energize a class					
Activities to improve student behavior and classroom climate					
Activities to re-engage the class after a school break					
Ways to leverage schoolwide opportunities to promote classroom physical activity					

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(Strategies for Classroom Physical Activity in Schools Strategies for Classroom Physical Activity in Schools 2, 2018).