

## Assignments

### Using the Heart Zones System to Evaluate the Efficacy of Select SPARK Activities Implications for Practice

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*This assignment allowed students to evaluate the efficacy of evidence-based practices in physical education. Students participated in four different activities, evaluated Heart Zones class summary reports, and identified implications of the results on teaching practices.*

My professional mission is to increase physical activity in the population. I do this by preparing future K-12 physical education teachers. I work with undergraduate physical education and Liberal Studies majors and many eventually become teachers of physical education in K-12 schools.

I strive to prepare all of my students to be effective physical education teachers in the real world. To this end, it is essential for my students to be able to utilize evidence-based practices associated with higher levels of moderate to vigorous physical activity (MVPA) and achievement of health-related fitness. It is also important for my students to be able to use the latest technological innovations to enhance teaching and learning.

The preparation of physical education teachers is an important endeavor. Physical education is the only subject that aims to increase health-enhancing MVPA and improve health-related fitness. These outcomes are essential for healthy growth and development, and are protective against chronic health conditions. It is important for every physical education teacher to have the knowledge, skills, and disposition for realizing these outcomes.

Since the start of the obesity crisis, a few evidence-based programs have demonstrated effectiveness (Guide to Community Preventive Services, February 25, 2020). Sports, Play, and Active Recreation for Kids (SPARK) is the world's most researched physical education program and consistently demonstrates positive outcomes associated with increasing MVPA and health related fitness <https://sparkpe.org/publications/outcomes>.

Related to instructional technology, wearable devices and applications have tremendous potential to advance pedagogical practices in physical education. The Heart Zones System is a leading innovation for monitoring heart rate and physical activity in physical education settings. It's efficacy is described in this powerful testimonial [video interview](https://www.youtube.com/watch?v=LgZoIp5v4UQ) of teacher Heath Mueller from Cedar Rapids, Iowa (<https://www.youtube.com/watch?v=LgZoIp5v4UQ>).

In this paper I will describe how students in one methods course used the Heart Zones System to compare and contrast Traditional Relay activities and activities from the SPARK grades 3-6 program (<https://sparkpe.org/curriculum/3-6/>).

### **General Procedures**

Students participated in selected activities. Physical activity and heart rate were monitored using the Heart Zones System (<https://heartzones.com/heart-zones-system/>). Students compared and contrasted the results and reflected about the implications of the lessons learned on their future teaching practices.

### **The Traditional Relays**

Students were organized in teams of five or six. The object was for every person on each team to complete one down and back. This was accomplished one at a time. Once the first relay was completed, students were re-organized into teams of three and the relay race was repeated.



*Students in the photo participate in a traditional relay. One student per team is running while four other teammates from each team appear to be standing and waiting for a turn.*

### **The SPARK Activities**

Students participated in three activities from the evidence-based SPARK 3-6 program (<https://sparkpe.org/curriculum/3-6/>).

Figure 1 shows the first page of SPARK’s Aerobic Bowling, SPARK’s Tag Team Traveling, and SPARK’s 4 Corners lesson plans (reprinted with permission). Each plan is structured similarly in a “Ready-Set-Go” format. The equipment, set up, specific instructions, specific cues, and challenge ideas are clear. Each lesson plan also identifies the learning standards covered by the lesson, suggestions for connecting the activity to academic core, and suggestions for how to “Spark up” each activity to make it even more fun and challenging (not shown).

### SPARK's Aerobic Bowling

Students were organized in teams of five or six. The object was to be the first team to win three matches. The first team to score 10 points by knocking down pins (1 point per pin) won the match. Team members took turns bowling the ball, one attempt per turn. Each team was spread out along a straight line stretched across the gymnasium. Players rotated one spot at a time completing unique tasks along the way (i.e., bowl, catch, push-ups, jumping jacks, hula hoop, jump rope).

### SPARK's Tag Team Traveling

Students were organized in pairs. One partner performed a task at their home base which was located on a designated spot on the perimeter of a large rectangular boundary. The other partner traveled one time around the perimeter (e.g., run-walk-gallop-skip) and then switched places with their home base partner. The activity ended after both partners completed two trips around the perimeter.

### SPARK's 4 Corners

Students were organized in teams of four. Students numbered off 1-2-3-4 and went to a designated corner to engage in a distinct task. Students rotated counterclockwise to the next corner every 45 seconds. The activity ended when every participant completed tasks at all four corners.

The figure displays three lesson plan cards from the SPARK program, each for a different activity. Each card is designed for grades 3-6 and includes a 'Ready...' section with materials and setup, a 'Set...' section with activity area details, a 'GO!' section with instructions, 'CHALLENGES' to increase difficulty, and 'CUES' for safety and timing. Diagrams illustrate the activity setups: a line for Aerobic Bowling, a rectangular perimeter for Tag Team Traveling, and a square with four corners for 4 Corners.

**AEROBIC BOWLING**  
**Ready...**  
 • 2 spot markers per group of 4 students  
 • 2 bowling pins (or substitute 2 lightweight cones) per group of 4 students  
 • 1 empty ball per group of 4 students  
**Set...**  
 • Create 2 parallel lines of spot markers and a third line of bowling pins.  
 • Lines are 5 paces apart, and spot markers in each line 3 paces apart.  
 • The first line of spot markers is the start. 2 students start here. The 2nd line of spot markers is the bowler's line. The 3rd line is for the bowling pins (or 2 cones) and where the ball retriever stands.  
**GO!**  
 1. The object is to use underhand rolling skills to score as many points as your group can before the signal.  
 2. On signal, the Bowler (or 2nd cone) rolls the ball toward pin/cones trying to knock them over. Bowler runs after the ball and sets up pin/cones for next Bowler (if needed) and stands safely off to the side.  
 3. The Ball Retriever retrieves rolled ball, runs to 2nd cone for the new Bowler, then continues to start line.  
 4. When you reach the front of the start line, run to be the next Bowler.  
 5. Continue bowling, setting up pins, retrieving and running until signal.  
**6. Scoring:**  
 • Strike (both pins knocked down) = 10 points  
 • Spare (1 pin knocked down) = 5 points  
**CHALLENGES**  
 • How quickly can your group score 50 points?  
 • How many points can your group score before the signal?  
**CUES**  
 • Bowlers, step forward with opposition, and release the ball when pointing at the target.  
 • Retrievers, move quickly to bring the ball to the next Bowler.  
 • New Bowlers, move to the bowling line quickly.  
 GRADES 3-6 9

**TAG TEAM TRAVELING**  
**Ready...**  
 • 4 cones (for boundaries)  
 • 1 spot marker per pair  
 • 1 piece of equipment per pair (use equipment you would already be using for your Spotlight on Skills Activity. (E.g., if teaching basketball skills, place 1 basketball at each spot.)  
**Set...**  
 • Create a large (20X30 paces) activity area.  
 • Scatter spot markers around perimeter to create 1 home base per pair.  
 • Place a piece of equipment at each spot.  
**GO!**  
 1. The object of Tag Team Traveling is to warm up the large muscle groups and to practice various skills to prepare for the activity to follow.  
 2. As you arrive at the activity area, find a partner and move to a spot around the perimeter.  
 3. One of you begins as the all around mover and the other begins as the home base.  
 4. On signal, all around mover moves clockwise around the perimeter following my prompt. Home base partner stays and practices a skill. (See below.)  
 5. (Sample all around movements include power walk, jog, gallop, skip, slide, leap, jump rope, etc.)  
 6. Sample home base movements include:  
 • **Beachball:** Toss and catch 1-handed; figure-8 around legs; kick up from foot to hands; toss to self under legs; toss to self behind back; toss, clap, catch, etc.  
 • **Basketball:** Ball-handling drills (See Basketball Skill Cards).  
 • **Stunts and Tumbling:** Various balances and stunts (See Stunts and Tumbling Skill Cards).  
 • **Fitness:** Various fitness exercises (See Fitness Circuit Skill Cards).  
**CHALLENGES**  
 • How many dribbles, catches, volleys, etc. can you do before your partner finishes their hoop?  
 • Instead of a tagline, what could you and your partner do to tag team?  
**CUES**  
 • All around movers, give your partner a high-five when you finish your hoop.  
 • When you have both finished L, you are ready for the next task.  
 • It's not a race. Show your best form throughout.  
 GRADES 3-6 15

**4 CORNERS**  
**Ready...**  
 • 4 cones (for boundaries)  
 • 4 Corners Task Card (SPARKfamily.org)  
**Set...**  
 • Create a medium (20X20 paces) activity area.  
 • Place a 4 Corners Task Card at each corner.  
**GO!**  
 1. The object of 4 Corners is to warm up the large muscle groups, using a variety of locomotor skills.  
 2. As you enter the activity area, move clockwise around the perimeter.  
 3. When you reach the first corner, read the Task Card and do the #1 locomotor skill from that corner until you reach the next corner.  
 4. Continue to do the #1 skill at each corner until you return to your original corner. Next time around, do the #2 skill.  
 5. Each time you reach a new corner, start a new movement. If you finish all of them before the stop signal, begin again at #1.  
 6. (Continue for 3-5 minutes.)  
**CHALLENGES**  
 • How many corners can you visit before the stop signal?  
**CUES**  
 • Stay on Skill #1 for all 4 corners, then change to #2.  
 • Work on quality, not speed.  
 GRADES 3-6 9

Figure 1. SPARK Lesson Plans: Aerobic Bowling, Tag Team Traveling, and 4 Corners

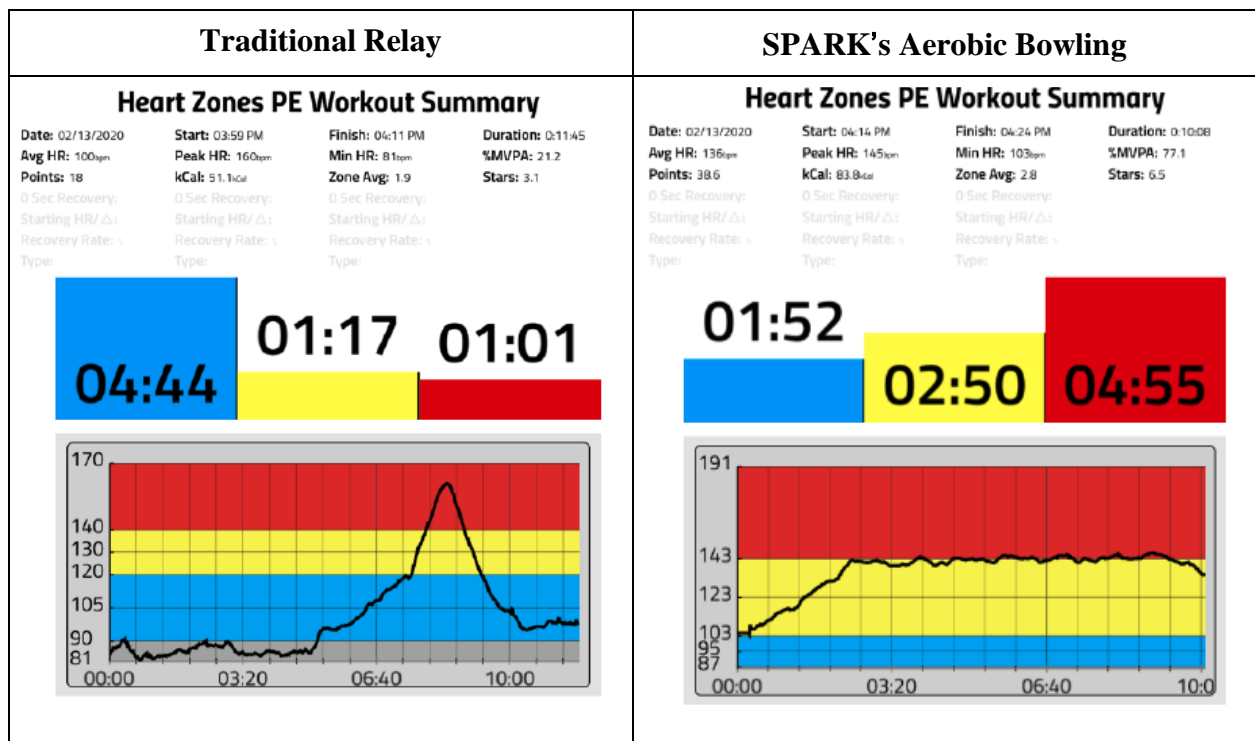
## Heart Zones Results

### *Traditional Relays vs SPARK's Aerobic Bowling*

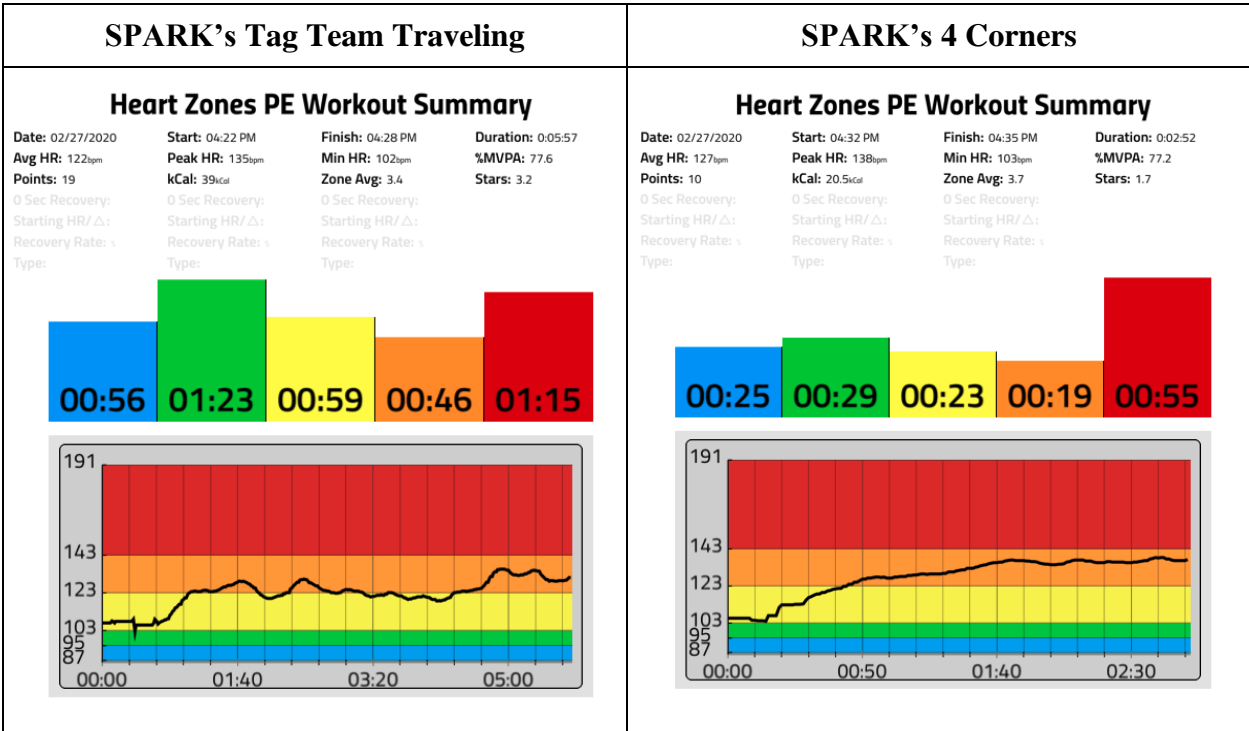
Figure 2 shows the Heart Zones Class Summary Reports for the traditional relays and SPARK's Aerobic Bowling. Almost all students recognized that SPARK's Aerobic Bowling was more effective (93%; 25 out of 27). MVPA% was much lower during the traditional relays (21%) compared to SPARK's Aerobic Bowling (77%). Average heart rate during the traditional relays was also much lower in comparison (100 vs 136 beats per minute). Two students thought the traditional relays were better because the peak heart rate was higher. They did not recognize that this was mostly attributed to re-organizing students from teams of five or six people to teams of three.

### *SPARK's Tag Team Traveling vs SPARK's 4 Corners*

Figure 3 shows the Heart Zones Class Summary Report for SPARK's Tag Team Traveling and SPARK's 4 Corners activities. Most students recognized that the MVPA% was excellent for both activities. When faced with making a choice, 52% thought SPARK's Tag Team Traveling was best (n = 14) while 41% thought SPARK's 4 Corners activity was best (n = 11). Two (7%) students thought the activities were equally effective. MVPA% was slightly higher during SPARK's Tag Team Traveling (77.6% vs 77.2%), but average heart rate was higher during SPARK's 4 Corners (127 vs 122 beats per minute). Many of the students who thought SPARK's Tag Team Traveling was better said they thought it allowed students more time to catch their breath and because it lasted longer (5:57 vs 2:52). Interestingly, students who thought SPARK's 4 Corners were better commented that it was more demanding.



**Figure 2. Heart Zones Summary Report: Traditional Relays vs Aerobic Bowling**



**Figure 3. Heart Zones Class Summary Tag Team Traveling**

**Implications for Future Teaching Practices**

Most students recognized that SPARK lessons were more effective because they were more inclusive, fun, and resulted in significantly more health-enhancing MVPA. Students made lots of good suggestions for future teaching practices with implications for making sure kids have fun, are adequately challenged, take adequate breaks to catch their breath, and have opportunities to take ownership and make choices during activities.

**Implications for PETE Practices**

Using the Heart Zones System to evaluate the efficacy of SPARK was effective. In the future, I will give students opportunities to select and design activities, so they have greater autonomy and ownership over the learning process.

**Notes**

1. Heart Zones Testimonial Video <https://www.youtube.com/watch?v=LgZoIp5v4UQ>
2. Photo credit <https://www.fotosearch.com/k33214786>
3. SPARK lesson plans reprinted with permission. Source <https://sparkpe.org/curriculum/3-6/>
4. Video example SPARK's 4 Corners <https://vimeo.com/352314260/762071b3a0>

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### **About the Author**

Dr. Nicole J. Smith is an Assistant Professor in the Department Kinesiology and Faculty Fellow in the Central California Children's Institute at California State University, Fresno. She aims to increase physical activity in the population. She does this by preparing teachers to implement evidence-based programs and by engaging in research to understand factors that influence physical activity in school settings. She publishes and presents work on topics including the utility of heart rate monitors and applications; school-based physical activity opportunity, high school physical education, the System for Observing Fitness Instruction Time, and physical activity policy.