FITNESS

Want to Add Pizazz to Your Weight Training Class? Try Sport Education!

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Abstract

Weight training classes are offered in many secondary level physical education classes. The type of instruction used during weight training is crucial, ensuring students understand the content knowledge and the enjoyment weight training has to offer as a lifetime activity. By using the sport education model (SEM) in weight training classes, teachers can encourage physical activity and physical fitness and students will have a positive experience. The purpose of this paper was to provide teachers who implement weight training the steps necessary to incorporate the SEM within a weight training program.

The prevalence of obesity among children aged 6 to 11 has more than doubled in the past 20 years, increasing from 6.5% in 1980 to 17.0% in 2006. The rate among adolescents aged 12 to 19 has more than tripled to 17.6% from 5.0% (Ogden, Carroll, & Flegal, 2008). Children who are overweight are more likely to remain overweight or become obese as adults (Casey, Dwyer, Coleman, & Valadian, 1992; Ferraro, Thorpe, & Wilkinson, 2003). With rising health care costs, reversing this trend in overweight and obesity among children is imperative. Physical education (PE) provides teachers

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the opportunity to encourage physical activity in children and adolescents. Siedentop (1996) stated PE should be a place where students learn to value physical activity. The National Association for Sport and Physical Education (NASPE, 2004) states a physically educated person "will display the skills and practices of a physically active lifestyle, knowing the benefits of their choice to be involved in physical activity" (p. 4). Based on national statistics, this vision is not being met. The Centers for Disease Control and Prevention (CDC, 2010) reported 23% of high school students did not participate in 60 or more minutes of physical activity that increased their heart rate or made them breathe hard some of the time on at least 1 day during the 7 days before a survey was provided to collect data. As PE teachers, what can you do to improve the physical activity of today's youth? One answer is to teach lifetime fitness activities such as weight training and fitness instead of traditional sports (e.g., basketball, flag football). Rikard and Banville (2006) reported that high school students are tired of traditional sports and want to try different activities. As PE moves from traditional sports, teachers must encourage weight training and fitness activity so students want to continue to participate in these activities after they complete their K–12 PE requirements.

The way a teacher teaches these activities can encourage participation levels and learning during PE. A teacher who decides to instruct on lifetime activities must choose an appropriate instructional model. An instructional model provides the teacher a guide to how to teach activities. One instructional model that has been used throughout the years is the sport education model (SEM). By using the SEM during weight training, students have the opportunity to learn weight training in an environment that promotes competence, literacy, and enthusiasm (Siedentop, Hastie, & van der Mars, 2011). The purpose of this paper was to provide teachers who implement weight training the steps necessary to incorporate the SEM with a weight training program.

Sport Education Model

The SEM was designed to ensure students become competent, literate, and enthusiastic in the activity being taught in PE class (Siedentop et al., 2011). To reach this goal, the SEM has characteristics that make it different from other curricular/instructional models. For the purpose of this article, we will break down how the SEM can be incorporated with a weight training program offered in middle and

high schools using the six characteristics of the SEM (i.e., season, affiliation, formal competition, record keeping, culminating event, and festivity).

Season

The first characteristic of the SEM is that the weight training is not called a unit but a season. The weight training season must be at least 20 lessons according to Siedentop et al. (2011). This number of lessons can be achieved in high school weight training classes because most high school PE curricula have one course specifically dedicated to weight training that lasts a semester on block scheduling (i.e., 90-min class) or an entire year on regular scheduling (i.e., 45- to 50-min class). The weight training season lasts the entire curriculum for this type of course. During the season, students would learn the proper lifting techniques, muscles being activated during exercises, proper training loads, repetitions, and sets of exercise. We reiterate that the SEM weight training season is to teach students the purpose of weight training and how to manipulate the training principles so students are able to write their own weight training program. Unfortunately, many weight training classes are taught in a style where the teacher has total control of the class. The teacher writes the exercises and training loads on a white board, but he or she does not explain the purpose of the exercises and rationale for the loads being used.

If the class is a regular PE class but the teacher wants to incorporate weight training in the curriculum, we recommend at least 20 lessons so students can become competent, literate, and enthusiastic. The breakdown of the season is important because a teacher has a tremendous amount of fitness content knowledge from which to choose for the season. First, what are the goals for the weight training season? Is it to teach basic weight training principles and the correct lifts when weight training? Teachers must decide what students are to learn and must incorporate this content within the SEM. For a regular PE class weight training SEM season, the goal would not be to increase strength but to educate students on the principles of weight training. No matter what content the teachers choose, they should incorporate the FITT principle of frequency, intensity, type, and time (Bulger, 2011) in designing the weight training season. We have planned a 20-lesson weight training season for a regular PE class for high school or middle school as shown in Table 1.

Table 1

Twenty-Day Sport Education Weight Training Season Plan

Lessons 1–3	• Fitnessgram® testing • 10RM testing to estimate 1RM • Place students on sport education teams by end of Lesson 3
Lessons 4–6	• Weight training exercises • Choosing correct weight to lift • Sport education contests ◊ Bench press and squat lifting form contest – Lesson 6
Lessons 7–17	• 75% of 1RM for power and multi-joint exercises • 3 sets of 8 to 10 repetitions for power and multi-joint exercises • 3 sets of 8 to 10 repetitions for single-joint exercises • Sport education contests ◊ Curl-up contest – Lesson 10 ◊ 12-minute run contest – Lesson 15 ◊ Content knowledge test contest – Lesson 17
Lessons 18–19 Culminating Event	• Post-Fitnessgram® team contest
Lesson 20	• Festivity and awards ceremony

Note. RM = repetition maximum.

For the high school weight training class or an after-school weight training program, teachers should use the periodization principle when designing the SEM weight training season. Periodization is the "preplanned, systematic variations in training specificity, intensity, and volume organized in periods or cycles within an overall program" (Wathen, Baechle, & Earle, 2008, p. 508). Teachers manipulate the volume and intensity of the weight training season to reach the two goals of periodization: (1) to reduce the potential of overtraining and (2) to have students to peak at an appropriate time or provide maintenance during a sport season (Stone, Stone, & Sands, 2007). For further details on periodization, see Wathen et al. (2008). An example of the high school SEM weight training season using periodization is provided in Table 2.

Table 2

High School Sport Education Weight Training Season Plan

Weeks 1–2	• Introduction to weight training exercises • Fitnessgram® testing • 10RM testing to estimate 1RM • Place students on sport education teams by end of Week 2
Weeks 3–5 Hypertrophy Phase	• 75% of 1RM for power and multi-joint exercises • 3 sets of 8 to 10 repetitions for power and multi-joint exercises • 3 sets of 8 to 10 repetitions for single-joint exercises • Sport education contests ◊ Lifting form contest – Week 3 ◊ Push-up contest – Week 4 ◊ 12-minute run contest – Week 5
Weeks 6–9 Basic Strength Phase	• 85% of 1RM for power and multi-joint exercises • 3 sets of 6 to 8 repetitions for power and multi-joint exercises • 3 sets of 8 to 10 repetitions for single-joint exercises • Sport education contests ◊ Curl-up contest – Week 6 ◊ Flexibility contest – Week 7 ◊ Agility drill contest – Week 8 ◊ 10RM on 2 multi-joint exercises (e.g., bench press and squat) – Week 9
Weeks 10–14 Strength/ Power Phase	• 85% of 1RM for power and multi-joint exercises • 4 sets of 4 to 6 repetitions for power and multi-joint exercises • 3 sets of 8 to 10 repetitions for single-joint exercises • Sport education contests ◊ Lifting form contest – Week 10 ◊ 300-yard shuttle contest – Week 11 ◊ Content knowledge test contest – Week 12 ◊ Vertical jump contest – Week 13 ◊ 12-minute run contest – Week 14
Week 15 Culminating Event	• Post-Fitnessgram® contest • 10RM to estimate 1RM testing contest • Festivity and awards ceremony

Note. RM = repetition maximum.

Affiliation

The second characteristic of the SEM weight training season is putting students on teams. Similar to how SEM is used for any other sport, the weight training season requires the teacher to put students on teams as early as possible. Team organization can be determined by several strategies. The first step is to assess student fitness levels

before the season begins using the Fitnessgram® (Cooper Institute, 2010). The Fitnessgram® is a nationally recognized fitness test that measures the health-related fitness components in cardiovascular fitness, muscular strength, muscular endurance, flexibility, and body composition. Teachers can choose from several available tests from the Fitnessgram®, so we recommend tests that measure at least one category from each health-related fitness component. We used the PACER test for cardiovascular fitness, push-up and curl-up tests for muscular strength and endurance, backsaver sit and reach for flexibility, and percent body fat for body composition. Body mass index is fine if a teacher does not have the skinfold calipers or a bioelectrical impedance analyzer to measure percent body fat, but body mass index can be misleading, especially at the high school level. Percent body fat is a more accurate measurement of body composition than body mass index (Nieman, 2007).

A teacher could put students on teams based solely on Fitnessgram® scores, but we recommend using additional information to select teams, that is, acquiring students' strength-to-mass ratio (SMR; Harman, 2008) on certain weight training exercises. After students complete the Fitnessgram®, the teacher should begin instructing students correct lifting techniques. Teaching correct technique is key to ensuring students understand that the goal is not the amount of weight they lift but how the weight is lifted (i.e., form). The teacher should prepare weight training checklists so students can evaluate each other's lifting technique when learning to perform the exercise (see Figure 1). Once the teacher has instructed correct lifting techniques, students will determine their one maximum repetition (1RM) for at least one upper body exercise and one lower body exercise to determine teams by performing a 10RM and then calculating the 1RM. Students should lift a weight that can be lifted 10RM then divide that number by 85%. This calculation can be done to estimate a 1RM, which will help with training loads during the season. Most teachers choose multi-joint exercises such as the bench press and the squat, which we used for this article. Students would not want to choose single-joint exercises such as dumbbell curls or leg extensions. Other teachers may choose power exercises such as the power clean and hang clean to determine teams. This is appropriate as long as students are able to perform these exercises correctly. How many exercises should a teacher choose to help determine teams? This decision is up to each teacher but having

Fitnessgram® data and an estimated 1RM for an upper body exercise and a lower body exercise is sufficient.

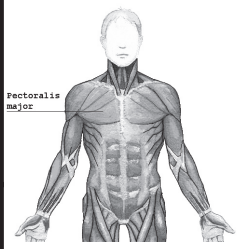
Performance Cues	Pictures	Major Muscles Worked
Lie flat on bench.		
Dismount barbell from rack over upper chest using wide overhand grip (wider than shoulder width apart).		
Lower weight to upper chest (do not bounce).		
Press bar until arms are extended.		

Figure 1. Bench press technique checklist. Pectoralis major image from http://en.wikipedia.org/wiki/File:Pectoralis_major.png.

Once the students have determined their 1RM, the teacher should go one step further and calculate SMR. SMR can be calculated by taking a student's 1RM and dividing it by the student's body weight in pounds. This SMR would be a variable in determining teams, not the amount lifted for the 1RM or the student's body size. For example, Student A who weighs 200 lb and can bench press 200 lb would have an SMR of 1.00. Student B who weighs 150 lb and can

bench press 200 lb would have an SMR of 1.33. Student B is actually stronger than student A based on the SMR, which is a more accurate assessment of strength than a 1RM when comparing students. Team selection should be based on SMR and Fitnessgram® data, not body weight. The teacher should put the data in an Excel spreadsheet and rank students according to their fitness scores and then select teams based on the data.

Teachers should determine the number of teams by the number of students and available equipment. Siedentop et al. (2011) recommended an odd number of teams to allow a duty team for more traditional sports (e.g., basketball, soccer) to help with refereeing and scorekeeping. We do not believe referees and scorekeepers are needed for weight training, so a duty team is unnecessary. For this reason, teachers can have an even number or odd number of teams for the weight training season.

Once teams are selected, students come up with a team name, team color, team mascot, team high five, and a team chant or cheer just like the original SEM (Siedentop et al., 2011). When teams have been selected, the students will stay on the same team throughout the weight training season.

Formal Competition

Unlike a traditional weight training unit, where students are more concerned about their own improvement, the SEM weight training season allows students to be concerned with how well the team is performing along with their own individual improvements. The SEM weight training season requires teams to compete. Once the teacher has selected the teams and teams have completed the affiliation sheet discussed in the affiliation section of this article, teams earn points throughout the season. A point contest is essential because it ensures team affiliation and that students will want to improve their health-related fitness to help the team. Students earn points for their team via the World Weight Training Competition Points System (see Table 3) by wearing team colors, performing daily roles, performing team cheer, and winning an application contest. The application contest allows teams to compete in an event-style contest (Siedentop et al., 2011). We recommend having a contest every 2 days if the season is 20 days long and every 5 days if the season is a semester-long weight training course. These application contests make the weight training season fun by incorporating an individual event that encourages overall team performance. Most contests will require

using an average team score instead of a total score. For example, one team may have five members and another team may have six members, making total scores inappropriate. To compare team scores, teachers should calculate averages to determine who wins the application contest. The following are examples of application contests to incorporate in the SEM weight training season.

Table 3

World Weight Training Competition Points System

Teams are awarded points for the following:	Points Available	Description
Team wears team colors	5 points	For every team member that does not wear the team color, deduct 1 point.
Team members perform daily roles	5 points	For every team member that does not perform his or her daily role, deduct 1 point.
Team performs team cheer	5 points	Team performs team cheer, they earn the points.
Team wins application contest	5 points	First place team – 5 points Second place team – 4 points Third place team – 3 points Last place team – 2 points
Good sportsmanship	2 points	If teams conduct themselves with good sportsmanship during daily contests, they earn 2 points.

Note. For every instance of unsportsmanlike behavior, the teacher may deduct 5 points. Adapted from "Bowling for a Lifetime Using Sport Education," by T. Pritchard and S. McCollum, 2008, *Journal of Physical Education, Recreation, and Dance, 79*(3), pp. 17–23.

Lift off contest. A lift off contest would likely be the most popular weight training application contest. The teacher selects one or two weight training exercises and has the students perform a 10RM and then estimate the 1RM. The team calculates each student's SMR and

then the team's average SMR. The team with the best SMR wins the contest and earns team points for coming in first place (5 points), second place (4 points), third place (3 points), and fourth place (2 points) if there are four teams.

Cardiovascular contests. Teachers can choose from numerous cardiovascular contests when doing this type of event. A timed jog or walk is a good event when a teacher is instructing on cardiovascular fitness. Teams jog or walk for a certain amount of time determined by the teacher (e.g., 12 min), and each student counts the number of laps (e.g., track or field) they complete during that time. When the time is up, each student records the number of laps completed on a team recording sheet, and then students calculate the team average number of laps. The team with the most average laps wins the contest. Why would you not tell students to complete a set number of laps and use their best time? The main reason to avoid using a set number of laps is that some students would complete the number of specified laps quicker and then have to wait until everyone in the class finishes. By counting the number of laps in a specific amount of time guarantees that students will start and stop at the same time, thus limiting waiting time. A timed jog or walk would also help to avoid embarrassments for students who would finish last in a 1-mile run. Other types of cardiovascular contests are mentioned in Siedentop (1994).

300-yd shuttle contest. The 300-yd shuttle (Gilliam & Marks, 1983) contest measures students' anaerobic capacity. The teacher should train the students to administer the test on themselves since testing many students can be time consuming for one teacher. The test requires a student to sprint 25 yd to a line, touch the line with the foot and then sprint back to the starting line, touch it and then sprint back to the 25-yd line. The student should do this six times (down and back would be one lap) for a total of 300 yd. The student's time is recorded, and then the student takes a 5-min break and then repeats the test. The average of the two timed scores is recorded as the student's final score. This is the official measurement of anaerobic capacity, but the teacher can adjust the test based on the students. For example, instead of doing two trials, the students can only do one trial. The teacher would have each team member measure their 300-yd shuttle time and then calculate a team average score. The team with the quickest average time would be the winner.

Push-up contest. This contest can be set up two ways with the first push-up event being identical to the Fitnessgram®. During this test, students perform push-ups to a cadence. Each student writes down his or her total number of push-ups on the team contest sheet, and then students calculate the team average. The team with the highest average push-ups score wins the contest. The second push-up event requires students to complete as many push-ups as they can in 1 min. Similar to the first push-up test, students write down the number of proper push-ups completed in 1 min and then calculate a team average. The team with the highest average score is the winner.

Curl-up contest. The curl-up contest can be set up similar to the push-up event with the curl-up event being the same as the Fitnessgram® curl-up test. Students see how many curl-ups they can complete with a cadence. Each student writes down his or her number on the team contest sheet and calculates a team average. The team with the most curl-ups wins the contest.

Flexibility contest. Students measure their flexibility using the Fitnessgram® backsaver sit and reach protocol. While teams are engaged in a regular workout, the teacher calls over one team at a time to have the team measure each team member's flexibility. Students should record results on a team contest report and calculate a team average. The team with the highest sit and reach average score is the winner.

Vertical jump contest. Each team member measures his or her vertical jump and then calculates the team average similar to the flexibility contest. Researchers have used the vertical jump test to measure muscle power (Harman, Rosenstein, Frykman, Rosenstein, & Kraemer, 1991; Markovic, Dizdar, Jukic, & Cardinale, 2004). The team with the highest vertical jump average score is the winner.

Agility drill contest. Teachers can choose from numerous agility drills for this contest (e.g., T-test, hexagon test, 20-yd shuttle, Edgren side step test). The T-test measures quickness and agility (Semenick, 1990). Four cones are required with Cone 1 at the starting line and Cone 2 ten yards from Cone 1. Cone 3 would be placed 5 yd to the left of Cone 2, and Cone 4 would be placed 5 yd to the right of Cone 2. Consequently, the four cones would form a *T*. When the timer says "Go," the team member would sprint from Cone 1 to Cone 2 and touch the base with the right hand. The team member shuffles to the left to Cone 3 and touches the base with the left hand. The team member shuffles all the way to the right to Cone

4 and touches the base with the right hand and then shuffles back left to Cone 2 and touches the base with the left hand. The team member back pedals from Cone 2 to Cone 1 with the timer stopping the clock when he or she passes Cone 1. The teacher should have each team member measure their T-test time and then calculate a team average score. The team with the quickest time is the winner of the agility drill contest.

Content knowledge contest. The content knowledge contest can be a simple quiz given at the end of a lesson, at the end of the grading period, or at the end of the semester or year as a final exam. The contest includes the health-related fitness components, identification of muscles activated during specific exercises, training loads, and so forth. Each team member would take a content knowledge quiz, test, or exam, and the team with the best average score is the winner of this contest. This contest ensures that students are learning the content knowledge associated with the weight training season instead of the traditional style, which is solely participation and absently learning the content knowledge.

Record Keeping

Record keeping is the fourth characteristic of the SEM weight training season. The teacher predetermines the types of records before the start of the weight training season. Most of the record keeping requires students and teams to keep a workout log. The log provides the weight training exercises students will perform, number of sets, number of repetitions, and load. Students should report the amount of weight lifted for each set of each exercise on their personal workout plan (see Figure 2). Record keeping includes each student's estimated 1RM and the Fitnessgram® data so students can track their progress through the weight training season.

Other records are kept for any team contest the teacher comes up with so teams can compete against each other. For example, each student records the number of laps he or she ran in a 12-min jog. The team with the best time average wins the contest for that lesson, earning a predetermined amount of points for winning. Another example requires teams to perform 1RM on the bench press as an event. The team with the best SMR wins the contest for that lesson.

Name: _____ **Team Name:** _____
Hypertrophy Phase: 75% of 1RM for hang clean, back squat, and bench press. All other exercises choose weight you can complete based on Set (Reps) Goal column.

Exercise	Set (Reps) Goal	Number of Reps Performed	Weight Lifted
Hang Clean	1 (8–10)		
Hang Clean	2 (8–10)		
Hang Clean	3 (8–10)		
Back Squat	1 (8–10)		
Back Squat	2 (8–10)		
Back Squat	3 (8–10)		
Bench Press	1 (8–10)		
Bench Press	2 (8–10)		
Bench Press	3 (8–10)		
Leg Curls	1 (8–10)		
Leg Curls	2 (8–10)		
Leg Curls	3 (8–10)		
Incline Dumbbell Press	1 (8–10)		
Incline Dumbbell Press	2 (8–10)		
Incline Dumbbell Press	3 (8–10)		
Triceps Kickbacks	1 (8–10)		
Triceps Kickbacks	2 (8–10)		
Triceps Kickbacks	3 (8–10)		

Figure 2. Personal workout plan. Students need to rest 1.5 min between sets and 3 min between exercises.

Culminating Event

The culminating event consists of a lift off contest. At the end of the season, students perform the Fitnessgram® plus the 1RM estimation for the upper body exercise and lower body exercise they did before the start of the season. Teachers can add to the events if they wish, but at a minimum, the previously mentioned tests should be performed. This event should be a celebratory session with students trying to beat their pretest scores and trying to earn team points for the overall contest winner. This last event is part of the festivity portion of the SEM weight training season. Teams compete against one another, and an awards ceremony follows. Appropriate

awards are given to individual students and to the overall team champion accumulating the most team points throughout the weight training season.

What Does a SEM Weight Training Lesson Look Like?

The difference between a SEM weight training lesson and a traditional weight training lesson is how instruction is given and how students are more involved. When students enter the weight room or gym, they go to their team's designated warm-up area. While students are waiting for other teammates coming from the locker room, the teacher should meet with student coaches of each team to cover the coaching plan. The coaching plan (see Figure 3) provides each team with instructions for the day's lesson and what exercise routine that team will follow. Student coaches go back to their team area where teams warm up using a fitness card led by the fitness trainer. The fitness card allows students to warm up as a team rather than warming up as an entire class (i.e., traditional weight training). The teacher needs to make sure each team is warming up correctly. Teams that are doing the warm-up correctly would gain points to be added to the team score for the overall contest winner. After the warm-up is complete, coaches go over the coaching plan with teammates, and then teams begin the exercise routine they are assigned. The teacher should instill this routine into the season as soon as possible and reinforce the routine via team contest points. While teams are performing their exercise routine, the teacher should constantly assess students via informal or formal assessments and through feedback on weight lifting form. If an application contest is scheduled for that day, the teacher should have time to complete the contest. For example, if the contest is a team push-up contest, then the teacher should allow enough time to complete the contest and provide a brief closure before students leave the weight room to get dressed. The application contest may take most of the lesson if it is a lift off day, so teachers should plan their time accordingly when designing the lesson.

Coaching Plan 1

Essential Question: What are the number of repetitions and percentage you would choose to train in the hypertrophy phase?

1. Calculate your target heart rate and put it on Workout 4 of your personal recording sheet.

2. We will begin working in the hypertrophy phase of our periodization phase. Determine your workload for this phase.

3. Take 1RM and multiply by 75% for the following multi-joint exercises and then put it on your personal recording sheet:

   Hang Clean
   Bench Press
   Back Squat
   Incline Press

4. All other exercises, you will choose a weight you can lift 3 sets of 10RM.

5. Today's workout will consist of 3 sets of 10RM at 75% of 1RM for power and multi-joint exercises. Make sure you get the appropriate rest in between sets and at end of each exercise.

6. Make sure you know what muscles are being activated during each exercise.

7. Team USA – Workout 1
   Team Russia – Workout 2
   Team Canada – Workout 3
   Team Germany – Workout 4

Figure 3. Coaching plan.

Recommendations

When implementing the SEM weight training season, the teacher may need to design several exercise routines because of lack of equipment. Like most high schools and middle schools, equipment can be scarce with only two to three places available to do the bench press. If a teacher has 30 students in the class, the teacher would not have everyone start with the bench press to prevent waiting time. By planning out several exercise routines, the teacher can assign teams to different exercise routines. The routine would be designed based on weight training principles (e.g., periodization) and on available equipment. In addition, the teacher must follow the correct

exercise order of power, multi-joint, and single-joint exercises when designing exercise routines (Baechle, Earle, & Wathen, 2008).

Conclusion

With the obesity trend continuing to increase, PE teachers need to encourage health-related fitness. Instead of teaching traditional sports, teachers should address more fitness-related subjects so students will continue these activities beyond K–12 education. Teaching weight training in middle and high schools can help educate students in promoting lifetime physical activity. The SEM used in conjunction with weight training can aid students in learning the content necessary for sustaining fitness beyond the classroom, thus decreasing the obesity rates with this population.

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