

WAVE Project: Sport Nutrition Education Resources

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Abstract

The WAVE~Ripples for Change: Obesity Prevention in Active Youth (WAVE) project's primary objective is to prevent unhealthy weight gain among high school athletes through healthy eating and reduced sedentary time. Educators are familiar with the myriad of challenges in presenting nutrition, diet, and physical activity information to high school students. WAVE uses adolescent athletes' interest in sport to draw them into the topic of sport nutrition and healthy eating; helping them apply the knowledge and skills they learned in class, on the field, and in their lives. WAVE developed and field-tested an after-

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Sport Nutrition Education Resources

school program for high school athletes that includes 7 sport nutrition lessons (30 to 45 minutes each) and 3 team-building, family and consumer sciences life-skill workshops. WAVE also developed a cloud-based data management system to support the tracking of learner profiles, survey administration, big data visualization, and automated health report generation.

Key words: sport nutrition, adolescent athletes, active youth, experiential learning, youth development

Background

The *WAVE~Ripples for Change: Obesity Prevention in Active Youth* (WAVE) is a 5-year integrated research, education, and Extension project funded by the National Institute of Food and Agriculture's Agriculture and Food Research Initiative. WAVE developed and field-tested educational materials with 488 multiethnic high school (HS) soccer players (14 to 19 years old). WAVE capitalized on adolescents' interest in sport to teach sport nutrition education to improve eating behaviors for sport performance, health, and obesity prevention. Athletes already know about physical activity (PA), training hard, and working toward a goal. WAVE capitalized on this interest and passion for sport by developing a program to encourage lifelong healthy eating and PA, thus, prevent unwanted weight gain as they transition to adulthood.

Educational Materials

The following WAVE resources complement each other but they can be delivered independently.

1. WAVE Sport Nutrition Curriculum

This evidence-based curriculum aims to improve eating behaviors for sport performance, weight management, and health (Manore, Meyer, & Thompson, 2009; Meyer, Manore, & Berning, 2012; Thomas, Erdman, & Burke, 2016). Included in the curriculum are the *2018 Physical Activity Guidelines Advisory Committee Scientific Report* (U.S. Department of Health and Human Services, 2018); position statements on sport nutrition, energy needs for sport (Thomas et al., 2017; Mountjoy et al., 2018), and sport nutrition for adolescent athletes (Desbrow et al., 2014); and information on hydration (Sawka et al., 2007) and exertional heat illnesses (Amstrong et al., 2007; Casa et al., 2015). The curriculum also incorporates best practices from key existing sport nutrition curricula (CATCH Global Foundation, 2014; Houtkooper, Abbot, & Mullins, 2007; National Dairy Council, 2017).

Sport Nutrition Education Resources

In pilot testing (2014-15), 30 high school soccer players (ages 14 to 19 years old) and coaches received all seven lessons face-to-face from registered dietitian nutritionists (RDNs) trained in sport nutrition (Certified Specialists in Sport Dietetics/CSSD), college athletes, or nutrition and exercise science educators. The curriculum was revised based on learner and educators' input. In the WAVE intervention, the curriculum was delivered over a 2-year period (2015-17) to teams of multiethnic soccer players ($n = 488$, ages 14-19) attending high school in Oregon and their coaches by a RDN trained in sport nutrition and experienced in collegiate or professional soccer. Post-intervention, two external reviewers blind-reviewed the curriculum.

Target Audience

The target audience is active youth. Although field-tested in high school soccer players, the curriculum is adaptable to address adolescents involved in many different sports and activities.

Educators

Knowledgeable nutrition or health professionals trained in sport nutrition can deliver the curriculum to active youth. These educators could be Extension Family and Consumer Sciences (FCS)/4-H faculty, high school health teachers, or RDNs.

Program Delivery

While we delivered the curriculum over the fall soccer season at high schools and during summer camps at the university campus, the delivery setting is flexible, including classroom, after-school, weekend/summer workshops or camps.

Content Highlights

The curriculum consists of seven lessons each lasting 30 to 45 minutes. The lesson duration can be flexible, depending on the number of activities the educator includes, and when and where the lessons are delivered. We found that coaches are reluctant to take practice time away for sport nutrition lessons; thus, we needed short, focused, and student-engaged lessons. Coach involvement with the lessons and reinforcement of the messages in practice are critical to engaging the athletes and changing behaviors. Table 1 lists the topics included in the curriculum, each based on the latest sport nutrition research, with reference sources provided in every lesson plan.

Each lesson contains the following items:

- Lesson plan, including in-class activities, supplies checklist, and specific references for additional information on the topic
- PowerPoint slides with presenter notes; unlocked for educators to customize the lesson for their audience
- Activities (such as clickers and recipe tasting) and worksheets to engage students
- Handouts for coaches or athletes

Table 1. WAVE Sport Nutrition Curriculum Description

Lesson titles	Lesson goals
Lesson 1: Hydration	<p>To provide athletes with the knowledge to understand the purpose of proper hydration for sport and exercise, and give them the tools and skills needed to implement a hydration plan to achieve the following:</p> <ul style="list-style-type: none"> • delay onset of dehydration, • improve and maintain training and performance, and • decrease risk of illness and injury related to dehydration.
Lesson 2: Pre- Exercise Fueling	<p>To provide athletes with the knowledge necessary to understand the purpose of proper fueling prior to exercise, and give them the tools and skills necessary to implement a pre-exercise fueling plan to achieve the following:</p> <ul style="list-style-type: none"> • delay onset of fatigue and dehydration by "topping off" fueling and hydration levels in the body, • improve and maintain training and performance, and • avoid GI (gastrointestinal) discomfort.
Lesson 3: During Exercise Fueling	<p>To provide athletes with the knowledge to understand the purpose of proper fueling during exercise, and give them the tools and skills necessary to implement a during-exercise fueling plan to achieve the following:</p> <ul style="list-style-type: none"> • provide fuel to maintain blood glucose levels; • delay onset of symptoms related to glycogen depletion, low blood glucose, and dehydration; • improve and maintain training and performance; and • avoid GI discomfort.

Table 1 (continued).

Lesson titles	Lesson goals
Lesson 4: Recovery Nutrition	To provide athletes with the knowledge to understand the purpose of proper recovery nutrition and the skills to implement a recovery nutrition plan to achieve the following: <ul style="list-style-type: none"> • replenish glycogen stores; • rehydrate; • initiate recovery and adaptation processes in the body that require carbohydrate, protein, and water; and • achieve the maximum gains from training to maintain and/or improve performance.
Lesson 5: Body Composition and Body Image	(Lessons are different for males and females.) Male: To provide athletes with an understanding of body composition, how it is measured, and factors that influence body size and composition. Female: To provide athletes with an understanding of body composition and a healthy perspective on body image in order to develop body appreciation and acceptance.
Lesson 6: Maintaining Muscle and Staying Well	To provide athletes with the knowledge to understand how nutrient timing and composition of foods/meals will help them meet their protein needs. To help athletes understand the importance of diet and lifestyle habits that will help them maintain a strong immune system and stay healthy while participating in sports.
Lesson 7: Eating Well while Eating Out	To help athletes understand how to make better food selections outside the home that are within their budgets. Raise awareness that cooking and eating food from home can be the most affordable and 'healthy' option.

2. Team-Building Workshops

The curriculum contains three 60- to 90-minute team-building workshops (TBWs) that cover the following topics: (1) Grocery Store Scavenger Hunt (grocery shopping/meal planning); (2) Let's Cook (meal preparation); and (3) Harvesting and Gardening (gardening techniques). Each TBW comes with a lesson plan, competition, knowledge and skill assessments, handouts, and signage (Table 2).

Table 2. WAVE Team-Building Workshops to Teach FCS Skills

TBW	1. Scavenger Hunt	2. Let's Cook	3. Harvesting & Gardening
FCS Skills	Grocery shopping and meal planning	Meal preparation	Gardening techniques
Learning objectives	<ul style="list-style-type: none"> Plan a lunch menu for two high school athletes or other youth group/club. Grocery shop within a \$10 budget to select the most nutritious ingredients. Understand how to compare prices by using the unit price. Read the nutrition facts label to make better food choices. 	<ul style="list-style-type: none"> Understand the health benefits of vegetable consumption. Increase exposure to unfamiliar vegetables. Learn basic kitchen safety and cooking techniques. Work in teams to prepare a pasta ratatouille recipe. 	<ul style="list-style-type: none"> Describe physical characteristics of three different plant families. Identify and harvest ripe produce. Describe the culinary characteristics of three crops from different plant families. With a team, create a recipe using the 'produce of the day' from a farm.
Workshop duration	60-90 minutes	60 minutes	60 minutes
Location	Grocery store nearest to school	School kitchen, classroom, cafeteria, or outdoor	School garden, nearest community or faith-based garden
Lesson materials	<ul style="list-style-type: none"> Lesson plan - adapted with permission from Cooking Matters At The Store Scavenger hunt map with tips Scoring sheet A written survey (2 questions) 	<ul style="list-style-type: none"> Lesson plan A plate with six vegetable options for each participant Signage for kitchen safety and knife cutting techniques. Judge's scoring sheet WAVE team role badges A written survey (10 questions) 	<ul style="list-style-type: none"> Lesson plan developed by Youth Farm manager Ingredient list for food tasting Knowledge assessment tool (dots and large post-it note) Farm-fresh produce to take home for free

Table 2 (continued).

TBW	1. Scavenger Hunt	2. Let's Cook	3. Harvesting & Gardening
Suggested reward	\$10 grocery store gift card for each youth or \$15 grocery store gift card for each winner	\$5 Jamba Juice gift card for each youth	Optional "produce of the week" for each youth to take home.

Educators

Knowledgeable professionals in gardening and cooking, such as Extension FCS/Master Gardener/4-H instructors, 4-H camp ambassadors, health teachers or RDNs, can deliver the workshops.

Program Delivery

Each workshop is independent. Delivery may be most feasible at/near school during after-school/weekend/summer/camps. To engage student-friendly competitions, each workshop provided gift card rewards.

3. WavePipe and OrangeWave

WavePipe is a cloud-based data management system hosted by Oregon State University for teaching/research professionals to store and manage participant data, communicate via texts/emails with specific groups, and schedule and administer online surveys. To manage measured PA, WavePipe automatically downloads and backs up Fitbit data daily and automates customized reports (e.g., health reports to compare participant's steps/day to their peers' average and national recommendations). WavePipe evolved into OrangeWave, which contains the most robust and popular features of WavePipe, with improved user interface, and is specifically designed to be more customizable by the user.

Accessing WAVE Resources

The WAVE Sport Nutrition Curriculum is available free of charge at <https://catalog.extension.oregonstate.edu/em9218>. The Team-Building Workshops Curriculum is also free and will be available at <https://extension.oregonstate.edu/families->

[health/nutrition/waveripples-change-obesity-prevention-active-youth](#) later in 2018. OrangeWave subscription is fee-based by request at the WAVE resource website.

Conclusion

The benefits of WAVE project resources make it worthy of consideration by health and youth development professionals because this is the first sport nutrition curriculum aimed at active youth in the United States. Professionals who take advantage of these resources will not only find them easy and practical to use; they can also feel more confident in knowing that all materials are research-based, and designed to address active youth developmental needs.

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Sport Nutrition Education Resources

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