



Tools for Learning Fuel for Moving

Performance-Related Nutrition Instructional Materials for Physical Education and Physical Activity Programs



Tools for Learning: Fuel for Moving

Table of Contents

	Page
Grades K-3	1
Kindergarten	2
Lesson 1	3
Lesson 2	4
Lesson 3	5
Lesson 4	6
Lesson 5	7
Lesson 6	8
Lesson 7	9
Grade 1	13
Grade 2	15
Grade 3	17
Grades 4-8	19
Grade 4	21
Grade 6	26
Grade 7	38
Grade 8	45
High School Courses 1-4	63
High School Course 1	69
High School Course 2	75
High School Course 3	81
High School Course 4	86

For programs receiving USDA's Supplemental Nutrition Assistance Program – Education (SNAP-Ed) funds: Some activities included in this document may not be allowable. Please contact your Program Manager with any questions about SNAP-ED allowability

Performance Related Nutrition

California's State Board of Education adopted content standards for both Health Education and Physical Education to provide clear descriptions of what students should know and be able to do in each of the content areas, at each grade level. Both disciplines address the content of nutrition, in specific and focused ways. This clarity provides opportunity for a community-wide approach to student learning of the principles of nutrition and good health.

The Physical Education Content Standards for California Public Schools, 2005, present a strand of content that is exclusive to the requirements of fueling the body for physical activity. This content links strongly with the content in the *Health Education Content Standards for California Public Schools, 2008*, it does not replace it, rather building a stronger context for the application of nutrition education. California students need a content rich K-12 physical education program and a skills based health education program at all Grade levels.

Families and community organizations can make significant contributions to our collective health by supporting and encouraging high quality instruction, assessment of student learning, and seizing any and every opportunity to encourage and support the learning of the vital content.

These instructional materials were designed to provide teachers with specific lessons for a sample of the content standards but do not provide lessons for all of the content standards. The California Department of Education, under contract with the California Department of Public Health's *Network for a Healthy California*, developed these materials to be used in classrooms, after school programs, youth organizations, community programs, and by families that seek to empower our children and youth to make healthy choices that fuel physical activity.

Performance Related Nutrition

Physical Education Model Content Standards

Kindergarten

- 4.2 Describe the role of water as an essential nutrient for the body.
- 4.3 Explain that nutritious food provides energy for physical activity.

Grade 1

- 4.2 Explain the importance of drinking water during and after physical activity.
- 4.3 Explain that nutritious food provides energy for alertness and mental concentration.

Grade 2

- 4.1 Explain the fuel requirements of the body during physical activity and inactivity.
- 4.4 Discuss how body temperature and blood volume are maintained during physical activity when an adequate amount of water is consumed.
- 4.5 Explain how the intensity and duration of exercise, as well as nutritional choices, affect fuel use during physical activity.

Grade 3

- 4.5 Explain that fluid needs are linked to energy expenditure.
- 4.6 Discuss the need for oxygen and fuel to be available during ongoing muscle contraction so that heat and waste products are removed.
- 4.16 Differentiate the body's ability to consume calories and burn fat during periods of inactivity and during long periods of moderate physical activity.

Grade 4

- 4.4 Identify healthful choices for meals and snacks that help improve physical performance.
- 4.5 Explain why the body needs water before, during, and after physical activity.
- 4.6 Explain why the body uses a higher percentage of carbohydrates for fuel during high intensity physical activity and a higher percentage of fat for fuel during low-intensity physical activity.
- 4.17 Explain the effect of regular, sustained physical activity on the body's ability to consume calories and burn fat for energy.

Grade 5

- 3.2 Plan a day of healthful balanced meals and snacks designed to enhance the performance of physical activities.
- 4.1 Record and analyze food consumption for one day and make a plan to replace foods with healthier choices and adjust quantities to enhance performance in physical activity.
- 4.2 Explain why dehydration impairs temperature regulation and physical and mental performance.
- 4.6 Record water intake before, during, and after physical activity.
- 4.15 Explain why body weight is maintained when calorie intake is equal to the calories expended.

Grade 6

- 4.7 Compile and analyze a log noting the food intake/calories consumed and energy expended through physical activity.

Grade 7

- 4.5 Describe the role of physical activity and nutrition in achieving physical fitness.

Grade 8

- 4.5 Explain the effects of nutrition and participation in physical activity on weight control, self-concept, and physical performance.

High School Course 1

- 2.2 Participate in enjoyable and challenging physical activities that develop and maintain the five components of physical fitness.
- 2.3 Meet health-related physical fitness standards established by a scientifically based health-related fitness assessment.
- 2.4 Use physical fitness test results to set and adjust goals to improve fitness.
- 2.7 Develop and implement a one-month personal physical fitness plan.
- 2.8 Analyze consumer physical fitness products and programs.

High School Course 2

- 2.5 Justify the use of particular physical activities to achieve desired fitness goals.
- 2.6 Develop and describe a physical fitness plan that enhances personal health and performance in future leisure and workplace activities.
- 2.8 Explain how to evaluate consumer physical fitness products and programs.
- 2.9 Identify and evaluate ergogenic aids that claim to enhance body composition, appearance, physical fitness, and performance.

High School Course 3

High School Course 3A - Adventure/Outdoor Activities

- 2.1 Participate in adventure/outdoor activities that improve health-related physical fitness.

High School Course 3B - Aerobic Activities

- 2.1 Identify and achieve a personal level of excellence in physical fitness.

High School Course 3C, 3D, 3E - Individual and Dual Activities, Dance, Aquatics

- 2.1 Meet physical fitness standards that exceed those of a scientifically based health-related fitness assessment.

High School Course 3F - Weight Training and Fitness

- 2.1 Establish a set of personal physical fitness goals, using the principles of training, and create a strength-training and conditioning program.

High School Course 4

High School Course 4A and 4D - Advanced Adventure/Outdoor and Dance

- 2.1 Achieve a level of fitness that improves health and performance and provides opportunities for enjoyment and challenge in an adventure/outdoor activity or dance activity.

High School Course 4B - Advanced Aerobic Activities

- 2.1 Identify and achieve levels of personal excellence in health-related physical fitness.

High School Course 4C - Advanced Individual and Dual Activities

- 2.1 Develop personal physical fitness standards that exceed those of a scientifically based health-related physical fitness assessment.



Grades K-3

Introduction

These instructional materials provide teachers of Grades K-3 with specific lessons that will provide an opportunity for their students to learn the content in the *Physical Education Model Content Standards for California Public Schools, 2005*, that address performance-related nutrition. These concepts provide students with important foundations in supporting both healthy eating and fueling the body appropriately for physical activity.

These lessons were designed for the physical education learning environment, and can be conducted within the required physical education instructional minutes for Grades 1-6 (a minimum of 200 minutes each 10 school days, EC 512110).

The materials presented here include a comprehensive approach to the content in Kindergarten, following with a series of lessons for Grades 1-3. Each of these can be expanded upon and further developed by teachers.

This material was developed by the California Department of Education under contract with the California Department of Public Health's *Network for a Healthy California*. Funding was provided by the United States Department of Agriculture, Supplemental Nutrition Assistance Program (formerly the Food Stamp Program). These institutions are equal opportunity providers and employers. In California, food stamps provide assistance to low-income households, and can help buy nutritious foods for better health. For food stamp information, call 877-847-3663. For important nutrition information visit www.cachampionsforchange.net

Kindergarten

Standard 4.2 Describe the role of water as an essential nutrient for the body.

This learning sequence provides teachers with practical, easy to use lessons that will provide opportunities for their students to learn the content in Kindergarten standard 4.2.

Information about the Content

Water is very important for your body.

1. Most of the body is water (60 percent).
2. Water carries nutrients.
3. Water helps to maintain normal body temperature.
4. Water helps the joints in our bodies move more easily.
5. Water helps the body to get rid of things it does not need by carrying them out of the body through the excretion process.

All the lessons are designed to help children learn a single piece of content (the objective) from the content standard. Lessons may be done multiple times to ensure that the learning has occurred. If the children do not fully learn the content intended for one specific lesson re-teach the lesson modifying it to fit the needs of the children to ensure the learning has occurred before continuing.

Classroom Management

The introduction to the lessons may be done inside the classroom where the use of additional resources may be helpful; whiteboard, cool climate, desks, and a quiet learning environment. The introduction to the lesson typically requires approximately five minutes. Students should also be engaged during the introduction with a variety of strategies (think-pair-share, question/answer, T charts, and demonstrations by the teacher).

Learning activities should be done in a space about the size of a basketball court on the grass or on the blacktop. Use cues for stop and start signal. "When I say go you may begin, when I say freeze everyone must stop moving, when the music starts you may move, when the music stops you must stop."

It is important to have children practice tagging each other softly or practice pulling flags without using unnecessary force. The teacher may start by having the students walk for the first round of the activity. Make sure all children stay on their feet, falling down may result in injury. In between rounds of the tagging activity sit the children down for 30 seconds and point out positive behavior and/or things they can improve on. Then assign the next locomotor skill they will use in the activity. Ask the children to share with each other the learning objective of the activity.

Closure is an important step in the learning process and is much more than collecting equipment and asking students to return to the classroom. For an effective closure, ask students to be seated (backs to the sun) for 2-3 minutes and debrief the lesson using a variety of strategies (think, pair, share, questions, and share outs) about their learning each day. Always be sure to restate the learning that occurred in the lesson.

Lesson 1

Objective Students explain that everyone needs water to survive.

Facilities Space similar as the size of the basketball court (grass or blacktop).

Equipment One flag belt for each student.

Introduction (5 minutes)

“Raise your hand if you drink water. Raise your hand if you have seen your dog or cat drink water. Why? One of the most important ingredient for our bodies to have in order to live is water. Water does many things in our body and without water our bodies can’t survive. So, everyone needs water to stay alive. We are going to participate in a learning activity to help us remember that everyone needs water to survive.”

Learning Activity (10 - 15 minutes)

Play a simple tag game with the opportunity to learn the content embedded in the game. Everyone is “it”. If a student is tagged, that student leaves the activity area and reports to the teacher. The student “earns” his/her opportunity to return to the game by correctly answering a question the teacher asks. The teacher will have three questions. After the student answers the question correctly they may re-enter the activity. If the student answers incorrectly have the child stand by you and listen to the same question with another student. Ask the student the same question to see if they correctly answer the question again. Play for 1-2 minutes and then stop the activity, ask a question related to the need for water for survival and the vital role it plays in the body’s work. Ask students to change the way they are moving each time the game starts again by designating a specific locomotor movement (walk, run, slide, gallop, jump, hop) to do as they move away from the “it” who is chasing them.

Question(s)

1. What does every person need to have to stay alive?
2. What is one of the most important thing for our body to have in order live?
3. If a new student in our class asked what the most important thing their body needs, what would you say to them?

Answer(s)

1. **Water**
2. **Water**
2. **Everyone needs water to stay alive.**

(Additional questions may be created and used in this activity)

Assessment

Formative assessment is embedded into the learning activity. Students must verbally answer one of the hydration questions correctly to re-enter the tagging activity. It will be the teacher's choice on which question to ask. Make decisions on the evidence students have provided you with to determine if further instruction is needed.

ELL Strategy

Have the questions on a poster board in English and alternative language of choice. For the closure use the sentence frame "Today I learned that _____."

Closure (2 minutes)

"Today we learned about water. Tell a partner what you learned about water. Who wants to share what they learned? Without water we can't survive. So everyone needs water to survive. We will learn what water does for us that make it so important in our next lessons."

Lesson 2

Objective Students will be able to explain that more than one half of the body is water.

Facilities Space similar to the size of a basketball court (grass or blacktop)

Equipment

1. One flag belt for each child. (*If you have no flag belts have the students use a light tag on the shoulder*)
2. Large water bottle decorated like a person – filled up approximately 60 percent full with water.
3. Sidewalk chalk.
4. Manipulative that would assist a student in demonstrating more than half of something.

Introduction (5 minutes)

Review the information from lesson 1 on the importance of water for all people. "Did you know that over half of your body is made from water?" Show the students with the use of a visual demonstration using a large water bottle decorated like a person filled up over half way with water.

Learning Activity (10 - 15 minutes)

Everyone is "it". If a student is tagged that student leaves the activity area. To return to the activity, the student must write or create the answer to the following question either on the blacktop with chalk or by using a manipulative to generate an answer.

Question(s)

1. How much of our body is made from water?

Answer(s)

1. "most"; or more than one half of your body is made of water.

After the student answers the question correctly they may re-enter the activity. If the student answers incorrectly have the child look at the large water bottle example and

explain to them that the body is mostly made of water. Play for 1-2 minutes and then stop the activity, ask a question that connects the important role of water in the body's work.

Ask students to change the way they are moving each time the game starts again by designating a specific locomotor movement (walk, run, slide, gallop, jump, hop) to do as they move away from the "it" person who is chasing them.

ELL Strategy

Have the question on a poster board in English and alternative language of choice. Use manipulatives to help children generate their answer. For the closure have the sentence frame "Today I learned that _____."

Closure (2 minutes)

"Today we learned even more about water and our body than last time. Tell a partner what you learned about water. Who wants to share what they learned? We will learn more about water in our next lessons."

Lesson 3

Objective Students will be able to explain that water carries nutrients through your body.

Facilities Space similar to the size of a basketball court (grass or blacktop)
Lesson can be administered in the grass or on the blacktop in a space similar to the size of a basketball court.

Equipment

1. One flag belt for each child.
2. Cards with pictures of food, or model food pieces.
3. 3 hula hoops.
4. Signs for the hula hoops. Labeled:
 - a. Brain
 - b. Muscle
 - c. Bones

Introduction (5 minutes)

"We have learned that water is very important." Turn to the person next to you and tell them how much of your body is made from water." If you said "most" or "more than half" you are correct. Today we are going to learn what water does for your body. What do you all think water does for your body? Well, it does many things but one thing it does is it carries important nutrients to your brain, muscles, and bones. Nutrients are the important things in food that help people stay healthy. Some examples of nutrients are vitamins and minerals; we get vitamins and minerals from the food we eat.

Learning Activity (10 - 15 minutes)

Everyone is "it". Tell all the students they are "water". If a student is tagged that student leaves the activity area. To return into the activity the student must transport important nutrients represented by healthy food to a hula hoop with a sign labeled brain,

muscles, or bones. Since all the students are water they are simulating how water transports nutrients through our body. Use a different locomotor movement (walk, run, slide, gallop, jump, and hop) for each round.

Alternative Activity

NUTRIENT TAG GAME: Water is represented by a student wearing a jersey (approximately 1 water jersey for every 5 students) all the other students represent the nutrients in food.

When tagged by a water jersey the student goes to the outside of the boundaries of the game and walks around. When all the “nutrients in foods” are tagged the “waters” lead a line of nutrients in food through the body (around a course of cones). Explain that water helps move the nutrients we get from food throughout the body. Use a different locomotor for each round: walk, run, slide, gallop, jump, and hop.

Assessment

Formative assessment is embedded into the learning activity. Students must simulate what water does in the body. Ask selected students what are they doing when they get tagged to transport nutrients we get from food. If they can't explain what they are doing explain to them that they are water doing the very thing water is doing in the body.

ELL Strategy

Food pictures and/or models are used. Pictures as well as words are used for the brain, muscle, and bone signs. For the closure have the sentence frame “Today I learned that _____.”

Closure

“Today we learned even more about water. Tell a partner what you learned about water. Who wants to share what they learned? What are the three places in our bodies that the water takes the nutrients from food we eat? We will learn more about what water does in our next lessons.”

Lesson 4

Lesson Objective Students explain that water helps to maintain normal body temperature.

Facilities Space similar to the size of the basketball court (grass or blacktop)

Equipment

1. One flag belt for each child.
2. 3-5 small spray bottles filled with water.
3. 2 sets of pictures. Pictures of:
 - a. people who are very hot during physical activity
 - b. people who do not look hot during physical activity

Introduction (5 minutes)

“What happens to you when you play for a long time? Do you get hot? Does your face turn red?” Well, when your body gets too hot you start to sweat. This cools your body down so you don't overheat.

Learning Activity (10 - 15 minutes)

Everyone is “it”. If a student is tagged that student leaves the activity area. Before returning to the activity, students must assess themselves to see if they are overheating or not. If they are overheating they must squirt themselves with water to represent sweating, and thus cooling off the body. If the students are not overheating then they must run around the activity area one time before they re-enter the activity. Play for 1-2 minutes.

Then stop the activity and ask the students key questions about the signs of overheating and also how the body cools itself (sweating). Each time you begin the game again, select a specific locomotor movement (walk, run, slide, gallop, jump, and hop) for students to use.

Using a chalkboard/whiteboard make a T chart. On one side put places where you are cold on the other side places where you are hot. Have the students tell you what to put on each list. Explain that inside their body should be the same temperature whether they are hot or cold on the outside. Explain that water helps their body to stay the same temperature on the inside. When it is hot outside we sweat to cool off. When it is cold outside our body warms the water inside us.

Assessment of Student Learning

Formative assessment is embedded into the learning activity. Students must correctly identify if they are hot enough to simulate sweating or increase their activity by running around the area elevating their temperature. If children are not correctly evaluating themselves the teacher can point out criteria of feeling hot, heart pumping fast, and heavy breathing, feeling warm inside, and sweating. Students may also ask each other if they look red or hot to help them identify their temperature.

Closure (2 - 3 minutes)

“Today we learned about water and how it helps keep our body cool. Tell a partner what you learned about water. Who wants to share what they learned? What are some signs of getting too hot?”

Lesson 5

Objective Students will explain that water helps the joints in our bodies move more easily.

Facilities Space similar to the size of a basketball court (grass or blacktop).

Equipment:

1. One flag belt for each child.
2. Two cones.
3. Two signs, one containing the word “Hydrated” and one the word “Dehydrated.”

Introduction (5 minutes)

“Put your hands on your elbows, put your hands on you knees, and put your hands on your shoulders. Turn to a partner and tell them what we call these areas of our body.” Yes, they are joints. Did you know that when we have enough water in our bodies it helps our joints to move more easily? If you don’t have enough water in your body, your joints can not move as easily or as well as they can when we have plenty of water. When we have enough water in our body we are hydrated, can you all say hydrated with me? When we don’t have enough water in our body, it is called dehydrated. Let’s say that word together. Today we are going to participate in a learning activity to help learn that having enough water in our bodies is very important to help our joints move more easily.

Learning Activity (10 - 15 minutes)

Everyone is “it”. If a student is tagged that student leaves the activity area. Every child must either say “dehydrated” or “hydrated” every time they pull someone’s flag. Depending on what the tagger says, the person who got tagged must go to the appropriate station. If the tagger said “hydrated” the student will go to the hydrated station and move their joints as much as they can for 10 seconds. If the tagger says “dehydrated” the student will go to that station and move without using their joints for 10 seconds (looks like a robot does). This will help simulate that water lubricates joints and not enough water makes movement of the joints more difficult and not very smooth. Play for 1-2 minutes, then stop play and ask the group questions about the role of water in helping the joints. Specify a different locomotor (walk, run, slide, gallop, jump, and hop) for students to use each time play begins again.

Assessment of Student Learning

Formative assessment is embedded into the learning activity.

ELL Strategy

Draw a picture of a robot on the dehydrated poster and a person moving their entire joint on the hydrated poster. For the closure have the sentence frame “Today I learned that _____.”

Closure (2 - 3 minutes)

“Today we learned even more about water and how important it is to our bodies. Tell a partner what you learned about water today. Who wants to share what they learned? What does hydrated mean? What does dehydrated mean?”

Lesson 6

Objective

Students will be able to explain that water helps the body to get rid of things it does not need by carrying them out of the body through the excretion process.

Facilities

Space similar to the size of a basketball court (grass or blacktop)

Equipment

1. One flag belt for each child.
2. 30-40 pieces of crumbled up paper to simulate things that the body does not need (waste).
3. Garbage can or trash bag.

Introduction (5 minutes)

Hold up a piece of crumpled up paper and tell the students that it represents things the body does not need or waste. Explain that water helps our bodies get rid of things we do not need by carrying them out of the body through the excretion process. Today we are going to participate in an activity to learn how water helps us get rid of unneeded things or what we call waste.

Learning Activity (10 - 15 minutes)

Everyone is "it". Everyone is also water. If a person gets tagged, then they must run outside of the boundary, pick up one thing the body does not need and then get rid of it by putting into the trash bag or garbage can. The students then may resume the activity again. Play for 1-2 minutes. Use a different locomotor movement (walk, run, slide, gallop, jump, and hop) each time.

Assessment of Student Learning

Formative assessment is embedded into the learning activity. Students must simulate that water carries waste from the body. The teacher may ask the group in between rounds to tell a partner about the role water plays in removing things from the body it does not need.

ELL Strategy

Using waste wrappers to simulate what water does in your body. For the closure have the sentence frame "Today I learned that _____."

Closure (2 - 3 minutes)

"Today we learned about water and how our body uses it to help get rid things it does not need, or waste. Turn to a partner and explain to them what water does that helps us. Who wants to share what they learned? We will learn more about what water does in our next lessons."

Lesson 7

Participate in this lesson as many times as necessary until every child has completed the summative assessment described below.

Objective Students will describe the roles that water plays in the human body and explain why water is so important for the body.

Facilities Space similar to the size of the basketball court (grass or blacktop)

Equipment

1. One flag belt for each child.
2. 3-4 sets of flash cards that have water facts and pictures that will assist the non-reader with the facts.

Introduction (5 minutes)

“We have learned many important reasons why we need water and what water does in our bodies. Turn to a partner and tell them as many things about water as you can remember. Let’s see if we can come up with all of them.”

Learning Activity (10-15 minutes)

Everyone is “it”. Everyone is also water. If a person gets tagged they must take a card look at the picture and the words that describe the fact about water as they walk around the activity space. When they are finished they need to explain the fact on the card to the teacher before they can re-enter the activity. Play for 1-2 minutes. Ask students to use a different locomotor movement (walk, run, slide, gallop, jump, and hop), each time you start the game.

Summative Assessment

During this lesson place a video camera and an adult volunteer off to the side asking children a series of questions so they may have the opportunity to demonstrate the learning of the content standard in an interview format. Select students at random until all students have been interviewed. If you do not have access to a camera, refer to the interview sheet to record the students’ responses to measure if they have learned the content. Simply put a Yes or No if the student can answer the question correctly.

Closure (2-3 minutes)

“Today we got to show what we know about water. Turn to a partner and explain to them what YOU know about water and what it does to help our body. Who wants to share what they learned?”

With the class, review the five key facts to know about water. Ask if students will drink more water now that they know how important it is for every person.

Lesson 7 - Flash Card Facts

- 1. Water makes up most of your body.**
- 2. Water helps carry important parts of foods that keep us healthy, called nutrients.**
- 3. Water helps to maintain normal body temperature by cooling the body through sweat.**
- 4. Water makes it easier for your joints to move.**
- 5. Water helps carries things we do not need out of our body.**

Lesson 7 - Summative Assessment Record Sheet

Student Names	#1 How much of your body is made up of water?	#2 What does water do with the important parts of food, called nutrients?	#3 What does water help your body to do when you get too hot?	#4 How does water help you move your joints more easily?	#5 What does water do to help get rid of things our body does not need?
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					

Possible Acceptable Answers

1. "More than half of your body is made up from water" or "Most"
2. "Water takes nutrients from our food to the brain, muscles, and bones" or "Water carries important things from food to our bodies."
3. "Water helps cool your body" or "Water helps your body to sweat"
4. "Water helps your joints move easier" or "Water makes it easier for your joints to move smoothly."
5. "Water helps carry unneeded things from the body (waste)" or "Water helps move unneeded things from the body."

Unacceptable Answers

1. All of your body is made of water.
2. Water makes the body move.
3. Water makes you sweat.
4. Water makes your joints move.
5. Water makes waste go away.

Grade 1

Standard 4.2 Explain the importance of drinking water during and after physical activity.

Lesson Content

Review Kindergarten Lessons Content:

Water is very important for your body.

- Most of the body is made of water (60 percent).
- Water carries nutrients.
- Water helps to maintain normal body temperature.
- Water helps the joints in our bodies move more easily.
- Water helps the body to get rid of things it does not need by carrying them out of the body through the excretion process.

Grade 1 Content:

Your body needs water both during and after physical activity.

- **During** physical activity you sweat to cool your body and this results in water loss and may cause dehydration.
- **After** physical activity to replace the water you lost during exercise and still need to do the important work of water in your body.
- The current recommendation for children is to drink at least 4 ounces (a half-cup) of water every 20 minutes while exercising.

Equipment

- One sheet of paper for each student.
- Pencils and/or markers for each student.
- Six signs, each with one of the facts about water. (See list in Learning Activities)
- Set of activity cards (See Learning Activity #3)

Learning Activity # 1

How important is water?

Have each student draw all the things that their body needs to function on a piece of paper (water, air, food, sleep, activity or exercise, etc.) Ask the students to rank each item on a scale of 1 to 5 (1 most important, 2 next most important, and 5 being least important).

Discuss their rankings and why they choose them. Explain that besides air (oxygen), water is the most important thing their body needs to function.

Learning Activity # 2

Why is water important to your body?

Have six (laminated or on cardboard) signs spread around the room. Each sign should have one of the following statements written on it:

- Most of your body is made up of water (60 percent).
- Water helps carry nutrients around your body.
- Water helps you to maintain your normal body temperature.
- Water helps make your joints move more easily.
- Water helps your body to get rid things it does not need (waste).

Have the students break up into six approximately equal groups at each of the signs. Have all the students read the sign (with teacher help if needed); draw a picture of the fact on the sign. Then have the students stay in their groups and join the entire class. Each group should have a student who reads the sign and then have all the students in that group, show the rest of the class their pictures of the statement on the sign. Have all the groups repeat this process. After each group presents the teacher should check for understand by asking questions about each groups statement of the entire class.

Learning Activity # 3

Why does your body need water during and after exercise?

Have a set of laminated or cardboard cards with the following activities written on them with a picture of what is written:

- sitting watching television
- sitting playing a computer game
- walking around your house
- walking a dog around the block
- walking for a mile
- running for five minutes
- playing an entire soccer game
- playing an entire baseball/softball game.

Break the class up into ten groups. Have several of each of the following items: One gallon milk jugs, 2 liter water bottles, ½ pint milk cartons (empty and clean). One member of each group is picked to take a turn to pick up a card, which is face down on the floor. The student then reads the card (with help from the teacher) and shows the class the card and the picture on the card. Each group talks about how much water they think a person would use during and after the activity then sends a representative of their group to the area where the empty containers are and picks one up that they think would represent the amount of water a person would use during and after the activity. The teacher and the class should discuss all the choices each of the groups made.

Assessment of Student Learning

Formative assessment is embedded into this lesson through the carefully designed learning activities.

Closure (2 - 3 minutes)

Have the students sit in groups of three and share what they learned today. One student should focus their comments on Learning Activity #1, another student on Activity # 2, and the third on Activity # 3.

Grade 2

Standard 4.4 Discuss how body temperature and blood volume are maintained during physical activity when adequate amount of water is consumed.

Lesson Content

This lesson is one in a series of lessons to help students learn the content in standard 4.4. This lesson addresses the content piece related to what some of the signs are when not enough water has been consumed. This is related to body temperature regulation and also the effect water has on blood volume.

Learning Activity # 1

Explain that there are at least 10 important questions to ask yourself to determine if you have consumed enough water. Ask students to work in groups of three to see how many of those questions they already know. Ask them to check their work with a poster of the information below:

Explain how to tell if you have consumed an adequate amount of water.

Questions to Ask Myself to Learn if I Have Had Enough Water:

1. Is my mouth dry?
2. Are my lips dry?
3. Am I sweating during exercise?
4. Is my urine yellow?
5. Am I extremely tired?
6. Do I feel light headed?
7. Am I turning red?
8. Is my body temperature elevated or hot?

Learning Activity #2

Mr. Thirsty

Everyone is a tagger. If a student is tagged the student stops and participates in an aerobic activity in their own personal space (jog, jump rope, etc.) To be unfrozen, the player must ask them one of the above questions about consuming water and the symptoms a person may experience if they do not drink enough water. If the answer is yes to anyone of the questions the student goes and gets a drink of water. If the answer is no then the student becomes a tagger again. Play for 1-2 minutes. Use different locomotor skills for each round: walk, jog, run, slide, gallop, and hop. Each

time the children participate in the activity they may ask one question from the current day or any questions they can recall from previous time they participated.

Assessment

Formative assessment of student learning is embedded in the lesson activities. Additional information regarding student learning of this content is revealed in the group activity used for closure to the lesson.

Closure (2 - 3 minutes)

Create a chart on a white board or piece of poster paper that matches the chart below. Cover it until the lesson has been nearly completed and it is time for the lesson closure.

Say “Since water is so important to our bodies, let’s make sure we know what can happen when we have enough water and when we don’t have enough. Keep in mind many factors may be involved with these symptoms and water intake may be one of many. We’ll work together to complete this chart.

	When you have had enough water	When you have NOT had enough water
Lips and Mouth are . . .		
Urine is . . .		
Face color is . . .		
Energy is . . .		
Body temperature is . . .		

Grade 3

Standard 4.5 Explain that fluid needs are linked to energy expenditure.

Lesson Content

1. Energy is expended during activity.
 - a. Energy can be defined as the ability “to do work”.
 - b. Energy is measured by calories.
 - c. We eat food to get calories for energy.
 - d. Water helps transport nutrients from food we eat in the body to places where calories (energy) is released.

2. Explain the way your body cools itself during activity.
 - a. Evaporation of sweat is the body’s way of cooling itself during activity.
 - b. Heavy sweating may deplete body fluids and affects calorie release.
 - c. Explain that drinking fluids replaces the fluids lost while sweating.
 - d. Water is efficient for activity under approximately 90 minutes and “sports drinks” can be used if exercising longer or if there are other influential circumstances such as extreme hot/humid weather, improper clothing, or individual differences.

Equipment

1. Station markers.
2. Equipment as needed for each station.
3. Tokens of different colors representing the following: (poker chips or colored paper clips work well)
 - a. Fluid (one for each activity station x number of students).
 - b. Food (one for each activity station x number of students).
 - c. Energy (one for each activity station +2 x number of students).
4. Papers printed with 6 square panels with writing lines underneath (cartoon style).
5. Colored pens or pencils.

Learning Activity # 1

Mini lecture explaining each of the following concepts:

1. Our body uses energy that it gets from food.
2. The energy in food is measured in units called calories.
3. A calorie is a unit of energy. Specifically, a calorie is the amount of energy, or heat, it takes to raise the temperature of 1 gram of water 1 degree Celsius (1.8 degrees Fahrenheit).
4. This process needs water to happen.
5. Energy is needed all the time by our bodies to function, but we need more of it when we are active.
6. Our bodies also need water to help us sweat, to cool ourselves during activity.
7. Water needs to be replaced in the body, especially during a high level of activity.

Learning Activity # 2

Energy Collectors

1. Set up 4-6 activity stations parallel to each other with enough room to run in between them.
2. Set up a fluid station with a person to hand out tokens.
3. Set up a food station with a person to hand out tokens.
4. Set up an energy station with a person to hand out tokens.
5. Students must get a “fluid token” from the fluid station and a “food token” from the food station and take them to the energy station to exchange them for an “energy token.”
6. Explain that the students must give an “energy token” to the “gate keeper” at each activity station before they can perform the activity, get signed off by gatekeeper, and move on.
7. Students move through each activity one at a time and visit the fluid, food, and energy stations in between as needed to proceed.
8. They need one energy token to finish.
9. Students may be given 1 energy token in the beginning to be used anytime during the game to speed their progress – this also will break up groups.
10. Students can participate as individuals or groups of 2-4.
11. The class can be split in half and as one group is going through the stations the other groups can do a long walk around area of activity. They also can be given a token in the beginning and use it to finish their walk. This can be used to contrast the body’s use of energy during normal activities (walking) versus the body’s use of energy during high activity (stations).

Learning Activity # 3

Cartoon Power

Hand out paper with at least six square panels and writing lines underneath drawn on it. Instruct students to draw cartoons with captions underneath explaining the role water plays in your bodily functions, especially when you are active.

Give them the main characters of “Fluid Girl”, “Calorie Man”, and “Super Free Energy”, and let them make up one more character if they want.

Make sure to post key vocabulary words and their meaning for student’s reference

- calories – energy
- fluid – water

Closure

Review information from today’s activities, and then talk about how important water is for all people.

Assign homework:

Share cartoon with at least one adult (parent, coach, relative...) and explain to them water’s important role in using calories from food for energy. Have adult sign the paper to acknowledge participation in the activity and return to student who will return to the teacher.



Grades 4 - 8

Introduction

These instructional materials supply teachers of Grades 4-8 with specific lessons that will provide opportunity for their students to learn the content in the *Physical Education Model Content Standards* that address performance-related nutrition. Students of this age are eager to learn information that will empower them to make good decisions related to both healthy eating and fueling the body appropriately for physical activity.

The lessons were designed for the physical education learning environment, and can be conducted within the required physical education instructional minutes for Grades 1-6 (a minimum of 200 minutes each 10 school days, EC 512110) and for Grades 7-12 (a minimum of 400 minutes each 10 school days, EC 51222).

Each of the lessons is a component of a series of lessons and should be expanded upon and further developed by teachers to meet the needs of their students. As students reach the middle Grades with increased knowledge of performance-related nutrition from their K-3 experiences, teachers will be able to develop and deliver content rich lessons that go beyond these introductory lessons

This material was developed by the California Department of Education under contract with the California Department of Public Health's *Network for a Healthy California*. Funding was provided by the United States Department of Agriculture, Supplemental Nutrition Assistance Program (formerly the Food Stamp Program). These institutions are equal opportunity providers and employers. In California, food stamps provide assistance to low-income households, and can help buy nutritious foods for better health. For food stamp information, call 877-847-3663. For important nutrition information visit www.cachampionsforchange.net

Performance Related Nutrition

Have you ever considered the food that you eat and how it may affect your body and the exercise that it does? Professional athletes and Olympic athletes think about nutrition a lot. This is because they are always seeking to perform at their best. Most athletes have diets that include a high amount of carbohydrates.

Your body uses food for fuel and the type of food you choose can influence how your body performs. Your body uses a mixture of fat and carbohydrate during exercise. Carbohydrates are found in foods like cereal, pasta, beans, bread, rice, dairy products, fruits and vegetables. During high intensity exercise (higher heart rate; higher breathing rate) your body uses mostly carbohydrate for fuel. During lower intensity exercise (lower heart rate), your body uses a higher amount of fat for fuel. Your body is smart and it burns a different proportion of these fuels for a good reason.

The human body can only store a limited amount of carbohydrate in the body. This means that during longer and lower intensity exercise, it is beneficial for the body to use a higher proportion of fat for fuel even though there are less total calories used per unit time compared to that of higher intensity of exercise. Also, your body requires oxygen in order to burn fat as a fuel. Carbohydrates can be used for energy, with or without oxygen. During very high intensity exercise, your body can burn carbohydrate without oxygen being available. Have you ever noticed how hard you breathe during a sprint? This is an example when your muscles are mostly using carbohydrate for energy.

In addition to needing oxygen to burn fat, the body also must burn a little bit of carbohydrate in order to burn fat. This means that the body needs to have optimal levels of carbohydrate stored in the body. Without it, the body cannot perform at its best. This is especially true for endurance activities such as running, cycling, basketball, and soccer.

Grade 4

Standard 4.4 Identify healthful choices for meals and snacks that may help improve physical performance.

Prerequisite Concepts

Physical Education Content Standards

Grade 2: Standard 4.5 Explain how the intensity and duration of exercise, as well as nutritional choices, affect fuel use during physical activity.

Grade 4: Standard 4.17 Explain the effect of regular, sustained physical activity on the body's ability to use calories and burn fuel for energy.

Health Education Content Standards: Nutrition and Physical Activity

Grade 2: Standard 1. 4.N List the benefits of healthy eating (including beverages and snacks).

Grade 2: Standard 1. 7.N Identify a variety of healthy snacks.

Lesson Focus

Students will complete a final project by designing their own creative **snack** that may help improve performance.

Knowledge

1. Identify healthy snack choices by being able to read labels of a variety of sport bars.
2. Know the difference whether foods are healthy or not.
3. Plan for replacing foods with healthier choices, if necessary.
4. Relate food choices to physical performances: carbohydrates provide the majority of energy for moderate to vigorous physical activity, fats provide the majority of energy for low to moderate activity, and proteins are building blocks to help repair tissues and cells.

Skill

1. Students will be able to identify healthy choices of a variety of snacks by placing them in the order of healthiest to least healthy.
2. Be able to replace foods with healthier choices.
3. Design a snack of their choice that will help them to perform at their best.

Equipment

Yarn balls or some fun object to tag students. White paper, colored pens/pencils.

Assessment Tools

1. Worksheet on reading labels of snacks.
2. Tag game of making healthier choices vs. poor choices.
3. Creative snack design complete with label.

Differentiation/ELL Strategies

Participants will be using cooperative learning groups. Partners will be created to make it easier for students to understand the information if their command of the English language is not able to understand some of the concepts.

Sequence of Lessons

- Lesson 1: Model Activity #1 three times for students and provide an example for students to work in cooperative groups.
- Lesson 2: Continue Activity #1 with students' own food labels.
- Lesson 3: Activity 2.
- Lesson 4: Debrief the Activities.

Introduction

A potato is a potato and needs no label to tell you what it is. And to find out what a package of potato chips includes, you'll need to look at the label on the package. The label must list all the ingredients: potatoes, fat, salt. It must also have a Nutrition Facts label to give you information on the serving size of that food. A label must warn consumer's of a food's potential for causing an allergic reaction. Labels could, but are not required to, make statements that the food is delicious, tasty full of flavor (etc).

Labels must include:

1. Name of product.
2. Name and address of manufacturer.
3. Net contents in terms of weight or measure.
4. Nutrition facts contents.
5. Ingredients in descending order by predominance of weight.

The Nutrition Facts label provides information about the nutrients in a serving size of that food. You can tell if the food is a good source of nutrient by looking at the percent daily value of the nutrient. The daily value is the amount of nutrient that the food contains based on a 2,000 calorie diet. A daily value of 5 percent or less means the food is low in that nutrient. A daily value of 20 percent or higher, means that the food is a high in that nutrient. This information can help us to make healthy food choices.

Learning Activity # 1

Bring in an empty (clean) food package of a snack, such as a bag of nuts, a box of cereal, a carton of yogurt or milk. Look at the label on your package and use it to answer these questions on a separate sheet of paper.

Looking Carefully at a Snack

1. What is the name of the product?
2. What kind of food is it?
3. Look at the ingredients. Manufacturers list the ingredients in descending order by weight. What ingredient weighs the most and what ingredient weighs the least?

4. What is the serving size? How many servings are in the package?
5. Does the serving size/servings per package information seem realistic to you? Why or why not?
6. How many calories are in one serving?
7. How many of these calories are from fat? What is the percentage?
8. How many grams of fat are in one serving? What is the daily value for fat and carbohydrates?
9. How many grams of sugar are in a serving of this food? Is it natural or added?
10. Does it make any nutritional claims (ex. Low in fat—healthy)? Does it meet the requirement for its claims?

Tell the students if you think this food is a good choice for a snack. Be sure to list the reasons that helped you decide. Also, state the facts you looked at to make your decision (e.g., check the calories and calories from fat; limit the fat, cholesterol and sodium; look for dietary fiber, vitamin A, vitamin C, calcium, iron).

Learning Activity # 2

Students will play a tag game in an area that has the dimensions of a basketball court. 3 -5 students (depending on your class size) will be given a piece of equipment like a yarn ball or something similar that will represent a poor choice of a snack. Students that are tagged must come over to the teacher and pick a card from a stack and tell the teacher if it is a healthy snack or not a healthy snack and why they classify it as such. Then they can return to the game.

Learning Activity # 3

Students are given a list of snacks that are not healthy and with a partner; they make changes in the snack to make it a healthier choice.

Learning Activity # 4

Students create a snack of their choice and complete a label (included on next page) to show that this snack is healthy for them to eat and may help improve their performance.

Learning Activity # 5

Figure out how long it would take to burn off the calories in the snack you ate. Create a label that is similar to the sticker on a car that tells you miles per gallon. Students will need a food calorie guide and a list of activities with how many calories are burned per minute. The following formula can be used to complete this task.

STEP 1

Weight x calories per lb. /per minute = calories burned per minute

STEP 2

Number of calories in food/calories burned per minute=number of minutes it will take the person to burn off.

Resources

Nutrition: Concepts and Controversies

Frances Sizer and Ellie Whitney

Decisions for Health

Holt, Rinehart, Weiner

Sport Nutrition for Health and Performance

Melinda Manore & Janice Thompson

Internet Sources

www.mypyramid.gov

Sample Nutrition Facts Label Work Sheet

Food Item: _____

Serving Size: _____

Serving per Container: _____

Amount per Serving:

Calories: _____

Calories from fat _____

% Daily Value*

Total Fat: _____ grams

_____ %

Saturated Fat: _____ grams

_____ %

Trans Fat: _____ grams

_____ %

Cholesterol: _____ mg

_____ %

Sodium: _____ mg

_____ %

Total Carbohydrates: _____ grams

_____ %

Dietary Fiber: _____ grams

_____ %

Sugars: _____ grams

Protein: _____ grams

Vitamin A _____ %

Vitamin C _____ %

Calcium _____ %

Iron _____ %

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Grade 6

Standard 4.7 Compile and analyze a log noting the food intake/calories consumed and energy expended through physical activity.

Program Organization

Developmental Skills & Knowledge: This lesson builds upon several health education content standards that students are expected to learn in Grades four and five. If this knowledge is lacking, the teacher should recognize this through assessment and review of this content before attempting this lesson.

Instructional Planning and Support

More advanced physical education content

This content standard is interesting because it asks the student to compile and analyze a log of food intake and calories consumed in addition to the calories expended. The student looks at the relationship between calories in and calories out. The teacher should recognize that basal metabolic rate and dietary thermogenesis is also part of the energy balance equation. As students compare their calorie intake to calories expended, they may notice how hard it is to exercise enough to balance the equation. If so, this presents a teachable moment where the teacher can discuss the body's need for energy to simply exist through chemical processes and homeostasis. In addition, the teacher can point out that approximately 5 to 10 percent of the energy from food is required for digestion of the food taken into the body.

The estimated energy requirements for children are as follows:

Age, Years	Average Weight, kg	Average Height, m	Calories needed for basic bodily functions (at rest)	Physical Activity Level (calories/day)			
				Sedentary	Low Active	Active	Very Active
Boys							
9	28.6	1.34	1187	1530	1787	2043	2359
14	51.0	1.64	1578	2090	2459	2829	3283
18	67.2	1.76	1777	2383	2823	3263	3804
Girls							
9	29.0	1.33	1094	1415	1660	1890	2273
14	49.4	1.60	1337	1718	2036	2334	2831
18	56.2	1.63	1327	1690	2024	2336	2858
<i>Estimated energy requirements include calorie for growth</i>							

Source: Dunfor, M. Sports Nutrition, A Practice Manual for Professionals, 4th ed.

Instructional Technology

This lesson provides a brief listing of foods that a student can choose from to simulate an actual day of food consumption. This was provided so that the teacher and student address the standard without having to worry about large volumes of food databases in books or on the Internet. A teacher who has access to either a mobile lab or computer lab may choose to have students log an actual day of food intake and have students look up the calories for each food on some of the free food database resources on the Internet. Students who have Internet access at home may choose to do this as well. Some free sites include www.mypyramid.gov and www.fitday.com.

Involving Families

This lesson provides an opportunity to get parents/guardians involved with the student and content. Students can ask parents to also compile a log and students can assist them. This will help inform parents about your physical education program and help support student achievement.

Ancillary Materials

Audiovisual – Bill Nye the Science Guy, Episode #62: Nutrition

Lesson Objective

Students will compile and analyze a log noting the food intake/calories consumed and energy expended through physical activity.

Materials Needed

- Stopwatches
- Writing implements
- Paper for calculations
- Handouts
- Clipboards
- Volleyballs
- Basketballs
- Soccer balls

Activities

1. Students will read a brief explanation of energy balance and answer the review questions on the page 33, (this can be assigned as homework).
2. Students participate in a sport or activity in which caloric expenditure can easily be estimated. Walking, running, volleyball, basketball, and soccer are suggested. Students will estimate caloric expenditure with the table on page 28, (15-20 minutes activity and 5-10 minutes for calculations).
3. Students create a hypothetical food log by selecting from the list foods provided in the table (students who do not complete the food log will finish the log for homework).
4. Students add caloric expenditure to food/activity log.

Assessment

Students write a paragraph analyzing the amount of energy taken in through caloric consumption and the amount of energy expended through physical activity.

Vocabulary

- Energy
- Photosynthesis
- Fat
- Carbohydrate
- Glycogen
- Glucose
- Calorie
- Energy balance
- Caloric intake
- Caloric expenditure
- Homeostasis
- Dietary thermogenesis
- Basal metabolic rate

Energy

Your body uses **energy** to live and move. To live, your body requires a certain amount of energy. In addition, your body needs energy for physical activity, exercise, and work. Walking to school requires energy. Playing a sport at school requires energy.

Your body gets this energy from the foods you eat. In science class you will learn that all energy comes from the sun. Plants make energy from sunlight in a process called **photosynthesis**. This means that you can get energy from eating plants or by eating animals that have eaten plants.

The energy you get from eating food is also stored in your body for when you need it. It is either stored in your body as **fat** or as a **carbohydrate** in a form called **glycogen**. Almost all carbohydrates are from plant food. They usually come from breads, cereals, pasta, beans, and many other plants that you eat. Our bodies change the carbohydrates to **glucose** to use for energy. Glucose is available in your bloodstream. If we do not need energy, our bodies will change the glucose to glycogen and store in your muscles or in an organ of the body called the liver.

The human body stores energy for when you need it. Storing energy is a good thing, however, storing too much energy as fat means that a person can gain too much weight. Too much weight on the body can be hard on the body and can increase risk of certain diseases. This is why it is important to understand energy balance. To understand energy balance, you also need to understand what a calorie is. A **calorie** is a way to express the amount of energy from food that is taken into the body and the amount of energy that is expended or “burned” during activity. The word **calorie expenditure** refers to the calories that we use.

The table on page 28 shows the calories that are needed for boys and girls at various ages and activity levels. It also shows the number of calories required for your body’s most basic functions that are needed to live. When you are active through exercise, playing sports or doing work around your house, the body requires more calories.

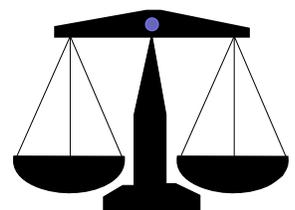
Calories In and Calories Out – It’s a Balancing Act!

Energy balance includes the food or energy you take into the body and the energy you use. The energy you take in is called **caloric intake**. The energy you use is known as **caloric expenditure**. Expenditure comes from the word expend, meaning to make use of. So when your body moves, you expend calories.

People often wonder about how the body gains, loses, or maintains weight. If you watch the evening news or pick up a fitness magazine, you will notice many fad diets that promise weight loss as if it were a magic pill. The truth is that body weight is simply an **energy balance** between caloric intake and caloric expenditure. If you eat too many calories, your body will gain weight. If you burn more calories than you eat, your body will lose weight. To maintain body weight, you must balance the calories taken in with the calories used in all activities.

To know how many calories you are eating, you must know where to find this information. You can find the number of calories of energy for almost any food you eat. Many times, the number of calories is found on the food label you see on food packages. **Food tables** also list the number of calories in food. These tables can be found in certain books and on the Internet.

You can also estimate your caloric expenditure. If you keep track of the amount of time you participate in physical activity and you know how much you weigh, you can look up the number of calories expended for many different types of sports or activities.



Review Questions

Directions: Answer the following questions on a separate sheet of lined paper.

1. Explain what a calorie is.
2. What does the word “consume” mean?
3. What is a log used for?
4. What does it mean to analyze something?
5. What is the definition of physical activity?
6. What does “expend” mean?
7. What is energy balance?
8. Where can you find information about the number of calories in different foods?
9. How can you estimate the amount of calories you consume?
10. What is a simple way to estimate how many calories you expend?
11. Where can you find information on the number of calories used in various physical activities?
12. What two things do you need to know when using a table to estimate calories used for a physical activity?

Activity 1

For this activity, you will:

1. Participate in a sport or exercise and record the length of time. You can choose from **basketball** (playing a game), **running**, **soccer** (playing a game), **volleyball** (playing a game), or **walking**. If you choose running or walking, you will need to calculate the distance traveled to figure out how fast you were running or walking.
2. After participating in your physical activity, you will estimate the number of calories you expended. A table with the information has been provided below. Please note that you will also have to know your body weight.
3. To convert your weight in pounds to kilograms, see the example below.

2.2 pounds (lb.) and 1 kilogram (kg) represent the same weight. This means that you can multiply a person's weight in pounds by 1 kg over 2.2 lb.

130 lb. multiplied by 1 kg / 2.2 lb. = 130 kg / 2.2 = 59 kg (nearest whole number)

My weight = _____ lb. X 2.2 kg/lb. = _____ kg

4. Estimated Number of Calories I expended during this activity = _____

Body Weight in Kilograms	20	25	30	35	40	45	50	55	60	65
Activities	Calories per 10 minutes									
Basketball	35	43	51	60	68	77	85	94	102	110
Running 8 km/hr	37	45	52	60	66	72	78	84	90	95
10 km/hr	48	55	64	73	79	85	92	100	107	113
12 km/hr	---	---	76	83	91	99	107	115	125	130
14 km/hr	---	---	---	---	---	113	121	130	140	148
Soccer	36	45	54	63	72	81	90	99	108	117
Volleyball	20	25	30	35	40	45	50	55	60	65
Walking 4 km/hr	17	19	21	23	26	28	30	32	34	36
6 km/hr	24	26	28	30	32	34	37	40	43	48

Source: Bar-Or, O & T.W. Rowland. Pediatric Exercise Medicine.

Additional Helpful Information

Calculating running or walking speed

Most running tracks are $\frac{1}{4}$ mile per lap. Check with your teacher about the distance of the course available at your school.

Step 1: What is your total time in minutes and seconds?

Step 2: Convert your seconds to minutes by dividing by 60.

For example, if your time is 10 minutes 30 seconds, divide 30 seconds by 60 to get .5 minutes.

Step 3: Add that number to minutes. This is the total number of minutes for you walk or run.

For example, if you add the .5 minutes above to the 10 minutes, you get 10.5 minutes.

Step 4: Convert minutes to hours by dividing minutes by 60.

For example, 15 minutes divided by 60 is .25 hour or $\frac{1}{4}$ hour.

Step 5: 1 mile is equal to 1.6 kilometers. This means you can convert your miles to kilometers by multiply miles by 1.6.

For example, .25 miles x 1.6 = .4 kilometers

Another example, 2 miles x 1.6 = 3.2 kilometers

Step 6: Divide distance by time in hours from step 4.

Step 7: Compare your walking or running speed to the table above to determine the calories you used for every 10 minutes of exercise.

For example, if you ran for 30 minutes at 8 km/hr and you weigh 50 kg then you used approximately 78 calories for every 10 minutes of exercise.

Since 10 minutes is $\frac{1}{3}$ of 30 minutes, you can multiply 78 by 3 to get a total of 234 calories for your 30 minutes of running. Keep in mind that is an estimate.

Activity 2

Next, compile a list of possible foods you could eat in one day. Be sure to include breakfast, lunch, dinner, and snacks. Record the foods, amounts, and calories. Your teacher may let you record actual foods eaten if you have access to a food database on the Internet. If you do not have access to the Internet you can use the list below to come up with an imaginary menu for a day.

Breakfast type items	Serving Size	Calories
Blueberry muffin	1	160
Nutri-Grain strawberry bar	1 bar	140
Oatmeal, maple & brown sugar, instant	1 packet	160
Cheerios	1 cup	110
Frosted Mini-Wheats	5 biscuits	175
Honeycomb	1 cup	86
Rice Krispies	1 cup	102
Trix	1 cup	88
Bagel	1 large	365
Pancake, frozen	1	92
Entrée items	Serving Size	Calories
Cheese pizza	1 medium slice	290
Taco Bell 7-layer burrito	1	520
Bean burrito	1	225 - 400
Enchiladas with cheese	1	320
Cheese quesadilla	1	550

Nachos with beef, beans, cheese & peppers	1	570
Hamburger, double patty, large, with condiments, vegetables and mayonnaise	1	942
Cheeseburger, large with vegetables and condiments	1	480
McDonalds Big Mac	1	590
Hamburger, single large patty, condiments, vegetables and mayonnaise	1	560
Ham & cheese sandwich	1	350
Turkey with mayonnaise sandwich	1	330
Spaghetti & meat balls with tomato sauce, prepared	1 ½ cup, 2 oz meat	350
Fried chicken	1 piece	225 - 325
Crispy chicken salad with honey mustard	1 salad	700
Caesar salad, with chicken, no dressing	1	220
Fruits and Vegetables (grains)		
Apple-raw with peel	1 medium	95
Banana	1 medium	105
Carrots, raw	½ cup	25
Green peppers	10 strips	5
Mango	½ fruit	67
Mashed potatoes	½ cup	85-115
Orange juice	½ cup	56
Pear	1 medium	105
Refried beans, canned	½ cup	119
Rice	½ cup	100
Tomato	1 medium	20
Beverages	Serving Size	Calories
Tap water	12 ounces	0
Coca-Cola Classic	12 ounces	98
Root beer	12 ounces	160
7-Up	12 ounces	150
Sunny Delight	12 ounces	195
Gatorade Thirst Quencher	12 ounces	96
Whole milk	1 cup	146
Reduced fat 2% milk	1 cup	138
Lowfat 1% milk	1 cup	102
Nonfat milk	1 cup	90

Food Log

Name: _____ Date: _____ Period: ____

Breakfast	Serving size	Calories

Total Breakfast Calories:

Lunch	Serving size	Calories

Total Lunch Calories:

Dinner	Serving size	Calories

Total Dinner Calories:

Snacks	Serving size	Calories

Total Snack Calories:

Total Calorie Intake for day:	
Exercise Caloric Output:	
Difference (subtract Caloric Output number from Caloric Intake):	

Did you expend more calories than you ate today? YES NO
If you do this for several days, what will happen?

Gifted and Talented Activity

The following is a cross-curricular lesson that is targeted toward gifted and talented students. It is a cross-curricular lesson that includes 6th Grade mathematics content.

Calories used can be estimated for walking or running with the use of mathematical formulas that have been developed by scientists. These formulas estimate the amount of oxygen required to run or walk for a certain amount of time. The formula estimates the rate at which a certain volume of oxygen is used by the body. This is called VO_2 . The V stands for volume, the O_2 stands for oxygen and the dot over the V stands for rate. The rate of oxygen is reported as liters per minute. This is abbreviated as L/min or ml/min. Once you know the liters per minute, you can estimate the calories required. The body uses 5 calories for every liter of oxygen used per minute.

To perform calculations, you will need to know your order of operations.

The formula to determine oxygen used for walking is:

$$(\text{ml/kg/min}) = [\text{Speed (m/min)} \times 0.1 \text{ ml/kg/m}] + [\text{Speed (m/min)} \times \text{Grade (decimal)} \times 1.8 \text{ ml/min/m}] + 3.5 \text{ ml/kg/min}$$

For this lesson, we will assume that you are walking on a flat surface. This means that the grade is 0.

Activity

Walk one lap around a $\frac{1}{4}$ mile course or track and time yourself. Be sure to walk at an even pace.

- Step 1:** What is your total time in minutes and seconds?
- Step 2:** Convert you seconds to minutes by dividing by 60.
For Example: if your time is 4 minutes 30 seconds, divide 30 seconds by 60 to get .5 minutes.
- Step 3:** Add that number to minutes. This is the total number of minutes for you walk or run.
For Example if you add the .5 minutes above to the 4 minutes, you get 4.5 minutes.
- Step 4:** Convert minutes to hours by dividing minutes by 60.
For Example: 15 minutes divided by 60 is .25 hour or $\frac{1}{4}$ hour.
- Step 5:** One mile is equal to 1,609.3 meters. This means you can convert your miles to meters by multiply miles by 1,609.3.
For Example: 25 miles \times 1,609.3 = 402.3 meters
- Step 6:** Divide you distance by time in hours from step 4.
402.3 meters divided by 4.5 minutes = 89.4 meters/minute

Step 7: Enter your variables into the walking formula.

$$(\text{ml/kg/min}) = [\text{Speed (m/min)} \times 0.1 \text{ ml/kg/m}] + [\text{Speed (m/min)} \times \text{Grade (decimal)} \times 1.8 \text{ ml/min/m}] + 3.5 \text{ ml/kg/min}$$

Example:

$$\text{VO}_2 (\text{ml/kg/min}) = [89.4 \text{ m/min} \times 0.1 \text{ ml/kg/m}] + [89.4 \text{ m/min} \times 0 \times 1.8 \text{ ml/min/m}] + 3.5 \text{ ml/kg/min}$$

$$= 8.94 + 0 + 3.5$$

$$= 12.44 \text{ ml/kg/min}$$

Step 8: Convert in ml/kg/min into in ml/min. To do this, multiply your weight in kilograms. For this example, we will use 65 kilograms.

$$(\text{ml/kg/min}) \times \text{body weight}$$

$$12.44 \times 65$$

$$= 808.6 \text{ ml/min}$$

Step 9: Convert in m L/min into L/min by dividing by 1000.

$$808.6 \text{ divided by } 1000 = .81 \text{ L/min}$$

Step 10: Convert in L/min into calories per minute. To do this, multiply L/min by 5.

$$.81 \times 5$$

$$= 4.05 \text{ calories per minute expended}$$

Grade 7

Standard 4.5 Describe the role of physical activity and nutrition in achieving physical fitness.

Prerequisite Physical Education Content Standards

Grade 6 Standard 4.7 Compile and analyze a log noting the food intake/calories consumed and energy expended through physical activity.

Sequence of Organization

This lesson can be incorporated into either a fitness unit or covered during one or two days during another unit, depending on how your schedule is organized. Students read the instructions and investigate the information, either online or in a handout/packet. There are two possible worksheets. One includes three samples with all of the information provided and the other consists of two samples, with blank lines for the students to enter their information. Students then analyze the samples, and complete the questions with a partner. The fourth activity includes a writing prompt, since this is where students will demonstrate evidence of learning the content in the standard. Again, this can be done on a computer or printed and written by hand. It is designed for students to work with a partner at the computer, but grouping can be augmented or eliminated based on classroom dynamics.

Instructional Planning & Support

Currently, students' knowledge and skills in physical education and health education may be uneven when they enter middle school. A review of previous standards pertinent to the topic/lesson intended for seventh Grade becomes critical for comprehension, some of which are included above. If students will be completing Worksheet B, they will need their most recent FITNESSGRAM scores, a sample day food log entry, and their frequency and duration of activity during a typical week. VO_2 Max can be optional if that is missing or the teacher deems appropriate.

More advanced physical education content: This standard is difficult because it is multi-layered.

- First, students must interpret how to measure physical fitness.
- Next, they need to understand the role of fitness on the body.
- Then, students must decipher the role of nutrition on the body.
- Finally, students should be able to describe how physical activity and nutrition work together to achieve fitness; providing evidence that the student has learned the content in the standard.

The teacher may want, or need, to break this standard down into several different lessons for that purpose, or if the students are having difficulty. To make it more advanced, teachers may want to use extremes as examples (e.g., professional athletes, a popular person, etc.)

Instructional technology

This lesson was designed to be completed using computer technology. It may also be delivered without that option by printing the information and making it available at different learning stations. Some sources to reference prior to the lesson include:

<http://www.fruitsandveggiesmatter.gov>

<http://apps.nccd.cdc.gov/dnpabmi/Calculator.aspx>

<http://www.cdc.gov/nccdphp/publications/aag/dnpa.htm>

<http://kidshealth.org>

Involving families

Students may want to include their families by using information from family members. The teacher may also use family members as the examples; giving the students time to access the critical information needed for the lesson. Results could be part of the Back-to-School, Open House, or other parent education opportunities.

Ancillary materials

Additional web resources, videos of athletes/students, more extreme sample food diaries/FITNESSGRAM® results based on population, MyPyramid.gov posters, Pediatric, and Adult BMI charts, visual serving size representations, videos of students performing FITNESSGRAM® tests.

Objectives

- Students will analyze information from three fictional students (activity levels, a typical day food diary, and scores on FITNESSGRAM® tests)
- Students will describe the roles of nutrition and activity in developing fitness.

Materials Needed

- Worksheet (3 samples, physical fitness indicator chart on back)
- Internet access
- Writing tools (paper and pencils/pens)

Vocabulary

- Nutrition
- Fitness
- Activity
- BMI
- VO₂Max

Activity 1: Investigation

Nutrition is the study of food and how it is used in your body. It is important to eat a variety of foods, including fruits, vegetables, dairy products, and whole grains, so you have what you need to grow and be healthy. Check out the nutrition label of some of your favorite packaged foods to learn more about what is in the foods you eat.

For more nutrition information, investigate the following information:

<http://www.fruitsandveggiesmatter.gov/>

<http://kidshealth.org>

Physical Activity: exercise, movement, sports, and fun things when you are moving (such as skateboarding, riding your bike, swimming, etc.).

For more information on activity, check out:

http://kidshealth.org/kid/stay_healthy/fit/work_it_out.html

Fitness: Being fit means that your body works efficiently. You can do the most amount of work with the least amount of effort. If you're fit, your body works well, feels good, and can do all the things you want to do, like run around with your friends. For more information, go to: http://kidshealth.org/kid/exercise/weight/fit_kid.html

BMI: Stands for Body Mass Index. To calculate this, you need your height and weight.

For more information about healthy weights for kids, go to:

http://kidshealth.org/kid/stay_healthy/fit/fat_thin.html (investigate the site or read each packet).

VO₂ Max: This is a measure of Cardiovascular Fitness, and has to do with the maximum amount of oxygen that a person can use during maximal exercise. The more fit you are, the more oxygen you can process from the air you breathe. The name comes from

V - volume per time, O₂ - oxygen, max - maximum.

Activity 2

What is the Fitness Level of the students below? Review their information, and rank them.

KYUNG MIN

Age: 13/Male

Height: 5' 2"

Weight: 117

BMI: _____

Check your BMI Chart to calculate

Mile: 7:13

Pacer: 62

Curl-ups: 80

Push-ups: 18

Sit & Reach/Shoulder

stretch: 8/Pass right

Max: 51

Check the FITNESSGRAM® chart

Grains: 8 oz.

Veggies: 3 cups

Fruit: 2 cups

Dairy: 3 cups

Meat/Beans: 6 oz. of lean meat and beans

H2O: 14 cups

Other: a few teaspoons of fat, a little sugar, no soda, fast food once a week

Total Calories: 2400

Physical Activity: 30-60 min.

6-7 days a week

Check the MyPyramid Activity chart

YOLANDA

Age: 14/Female

Height: 5' 6"

Weight: 167

BMI: _____

Check your BMI Chart to calculate

Mile: 11:32

Pacer: 12

Curl-ups: 21

Push-ups: 2

Sit & Reach/Shoulder

stretch: 12/Pass both

Max: 31

Check the FITNESSGRAM® chart

Grains: 16 oz.

Veggies: 1 1/2 cups

Fruit: 1/2 cup

Dairy: 2 cups

Meat/Beans: 12 oz. of Beef and Chicken

H2O: 9 cups

Other: 16-20 teaspoons of fat, 23 teaspoons sugar (including 2 sodas, one Monster Drink) fast food 3-4 times a week

Total Calories: 2850

Physical Activity: 20-30 min.

3-4 days a week

Check the MyPyramid Activity chart

BILLY

Age: 12/Male

Height: 4' 11"

Weight: 87

BMI: _____

Check your BMI Chart to calculate

Mile: 9:38

Pacer: 34

Curl-ups: 80

Push-ups: 6

Sit & Reach/Shoulder

stretch: 9/Pass both

Max: 48

Check the FITNESSGRAM® chart

Grains: 5 oz.

Veggies: 1 cup

Fruit: 1 cup

Dairy: 1 cup

Meat/Beans: 4 oz. of beans

H2O: 18 cups

Other: a few teaspoons of fat, a little sugar, diet soda, no fast food

Total Calories: 1300

Physical Activity: 90 min. 6-7 days a week

Check the MyPyramid Activity chart

Activity 3

What is the Fitness Level of the students below? Review their information, and rank them.

KYUNG MIN

Age: 13/Male

Height: 5' 2"

Weight: 117

BMI: _____

Check your BMI Chart to calculate

Mile: 7:13

Pacer: 62

Curl-ups: 80

Push-ups: 18

Sit & Reach/Shoulder stretch: 8/Pass right

Max: 51

Check the FITNESSGRAM® chart

Grains: 8 oz.

Veggies: 3 cups

Fruit: 2 cups

Dairy: 3 cups

Meat/Beans: 6 oz. of lean meat and beans

H2O: 14 cups

Other: a few teaspoons of fat, a little sugar, no soda, fast food once a week

Total Calories: 2400

Physical Activity: 30-60 min. 6-7 days a week

Check the MyPyramid Activity chart

YOLANDA

Age: 14/Female

Height: 5' 6"

Weight: 167

BMI: _____

Check your BMI Chart to calculate

Mile: 11:32

Pacer: 12

Curl-ups: 21

Push-ups: 2

Sit & Reach/Shoulder stretch: 12/Pass both

Max: 31

Check the FITNESSGRAM® chart

Grains: 16 oz.

Veggies: 1 1/2 cups

Fruit: 1/2 cup

Dairy: 2 cups

Meat/Beans: 12 oz. of Beef and Chicken

H2O: 9 cups

Other: 16-20 teaspoons of fat, 23 teaspoons sugar (including 2 sodas, one Monster Drink)

fast food 3-4 times a week

Total Calories: 2850

Physical Activity: 20-30 min. 3-4 days a week

Check the MyPyramid Activity chart

YOU!

Age: _____/_____

Height:

Weight:

BMI: _____

Check your BMI Chart to calculate

Mile:

Pacer:

Curl-ups:

Push-ups:

Sit & Reach/Shoulder stretch: /

Max:

Check the FITNESSGRAM® chart

Grains:

Veggies:

Fruit:

Dairy:

Meat/Beans:

H2O:

Other:

Total Calories:

Physical Activity:

Check the MyPyramid Activity chart

Activity 4 - Formative Assessment

Name: _____ Date: _____ Period: _____

Standard 4.5: Describe the role of physical activity and nutrition in achieving physical fitness.

Directions: Write a description of the role of physical activity and nutrition in physical fitness. Please include a topic sentence, support each idea, check your spelling, punctuation, and end with a thoughtful conclusion.

Grade 8

Standard 4.5 Explain the effects of nutrition and participation in physical activity on weight control, self-concept, and physical performance.

Sequence of Organization

The lessons and activities shown here for Grade 8 represents half of the content in this standard: how nutrition affects weight control, self-concept, and physical performance.

Instructional Planning and Support

This nutrition lesson sequence can be delivered in several ways.

Students may do the reading assignment and answer the first set of questions in class (optional: share answers with two different partners), then take the food log home.

They can answer the second set of questions in class or as homework.

Secondly, the reading and questions can be assigned as homework, and have students return to share their answers with a partner. They can fill out the food log in class every day or at home, and then fill out the second set of questions as homework or in class (also optional to share with partners).

If you want to include movement into the lesson, one suggestion would be to create a station workout where students complete a specific set of exercises or activities for one station and then do some of the cognitive work at alternating stations.

Another suggestion is to cut up the readings into “clues” and have students move all over campus/fields to find the clues. Laminated clues on clipboards are often effective. Students roam around to find the other clues in order to answer the questions, often having to return to the stations to get more information or clarification as an answer. The person who stays at the station with the clue/quiz rotates through so everyone gets activity. Other creative ways to implement movement are encouraged. There is flexibility in the method of content delivery.

More advanced physical education content

Students may have more advanced questions, or push past the content that is presented. The teacher may want to add more about how nutrition affects the three areas indicated in the standard, they may have their students obtain, either in class or at home, a personalized eating/fitness plan from www.mypyramid.gov before starting the lesson, or have students prepare the weekly log before and after the information is presented to see if it changes student’s food choices. Another advanced approach would be to have students do a group research project about the effects of nutrition on one of the areas: weight control, self-concept, or physical performance. Students may be given the choice how to present their findings to the class, from an oral presentation to a PowerPoint presentation. Finally, an auxiliary lesson on how to read labels is recommended.

Instructional technology

Students can easily do this assignment online. The instructor can could post the nutrition information on your web site, give them the questions and have them return them the next day. You could also have them complete the questions online, especially if you have an interactive way to do that. There is also plenty of nutrition information online, including the recommendation above at www.mypyramid.gov, as well as other government web sites like the CDC, and private free sites like Calorie Count.

Involving families

The food logs can be filled out by family members along with the students; students could do a comparison chart with their parents/siblings and report their findings. Students could also report the information to their families, and report/answer a questionnaire about the experience.

Ancillary materials

Encyclopedia of Sports and Fitness Nutrition by Liz Applegate; *Nutrition Concepts and Controversies* by Frances Sizer and Ellie Whitney.

Audiovisual

“SuperSize Me.” The Educational Version (with CD-Rom Lessons); “The Human Body” series on Discovery Science channel

Objective

Students examine and learn about effects of nutrition and participation in physical activity on weight control, self-concept, and physical performance. Supporting skills and knowledge are reviewed or introduced.

Materials Needed *(Depending on how the lesson is presented)*

- Photocopied packets/worksheets
- Computer lab
- Copied/laminated clues and numbers, clipboards, numbered cones

Vocabulary

- Nutrition
- Weight control
- Self-concept
- Physical performance
- Glycogen
- Lactic acid
- Calorie
- Caloric requirements
- Caloric intake
- Oxidation
- Antioxidant
- Carbohydrate
- Protein

Activity # 1

Student Reading Assignment

Food Recommendations for 13 - 14 year olds		
60 minutes or more of physical activity each day		
(From www.mypyramid.gov , custom food plans are also available at this site)		
	Male	Female
Grains	10 oz.	7 oz.
Vegetables	4 cups	3 cups
Fruits	2 ½ cups	2 cups
Milk	3 cups	3 cups
Meat & Beans	7 oz.	6 oz.

“What you eat profoundly affects the way you feel and look. What you eat can fuel your day and workout, helping you perform better and giving you more stamina.”¹ Nutrition can be a type of prescription for your body. In this activity, we are going to focus on three areas affected by nutrition: weight control, self-concept (self-esteem), and physical performance.

Weight Control

Most people know if you take in too many calories then you expend, you will gain weight, most likely with excess body fat. However, often people either don't know the accurate calorie count of what they're consuming, or forget high-calorie items, such as drinks and condiments.

As a growing and developing teenager, your eating habits and attitudes about food are starting to form as you become an independent eater. Food choices can have a very large effect on weight. For instance, your stomach senses volume, or the quantity of food eaten, not the calorie content of the food. Therefore, if you are eating refined foods (those that go through several processes in making them and lose nutrients as a result) that are higher in calories, you will eat more before you “feel” full. However, foods higher in fiber and water content such as fruits, vegetables and even soup help create a sensation of fullness.

Self-Concept

Your self concept is the mental image you have of yourself. Often, your self concept is highly influenced by those around you and what you see in the media. Eating disorders and poor body image often begin in the home, and can worsen with peer pressure. Magazines, television and films that portray rail-thin actresses/models to athletes who use steroids, can also influence how teens feel about themselves and their bodies. To create a healthy, developing body, you need to make healthy food choices rather than

focus on dieting or drinking muscle-building shakes. Good nutrition can help maintain energy and focus, allowing you to perform well. Eating well creates a better sense of well-being and satiation (satisfaction or feeling of being full), which increases your confidence. Often children your age meet or exceed their calorie requirements, but can be deficient in vitamins and minerals. This can negatively affect how you feel, perform, and your state of mind.

Physical Performance

You need to think about nutrition before, during, and after exercise for the best performance. Before you exercise, eating high-carbohydrate foods that are low in fat and protein are preferred because they digest quickly. If you exercise for long periods of time, longer than an hour, you may need to have a small amount of carbohydrate during exercise so you don't "bonk," or run out of energy. Your muscles store carbohydrate as **glycogen**. This comes from carbohydrates you have eaten. Unless you replace this, but will not if low to moderate exercise stored energy, you may run out of carbohydrate after 90 minutes of intense exercise. After you exercise, choosing the right foods to refuel your body is important because it can help you recover from the exercise and also determine how you feel the next day. In fact, the best time to replace glycogen is immediately after exercise. In general, fruits and vegetables, as well as whole grains like whole wheat bread, oatmeal and brown rice, are a good source of carbohydrates. Eating a variety of fruits and vegetables also provides you with antioxidants, which may help counteract some of the oxidation (damage done by unstable oxygen inside of your body, which increases after exercise). In general, people who exercise often need a little more protein than someone who does not exercise. Make sure you consume soy, fish, eggs, or lean meats each day. Finally, make sure you're drinking enough water to maintain optimal performance.

Taken from The Encyclopedia of Sports and Fitness Nutrition, by Liz Applegate
Three Rivers Press, 2002.

Activity # 1

Weight Control, Self Concept, Physical Performance

Name: _____ Date: _____ Period: _____

1. What are the recommended foods and amounts from each food group for teen boys and girls? (use MyPyramid.gov)
2. How close do you think you are to meeting your recommendation of food groups and daily servings? Explain and justify your answer.
3. List three ways that food choices affects weight control:
4. Why is it important to have a strong self-concept, especially as a teen?
5. How can your diet help you have a stronger self-concept? Give two detailed answers.
6. What other lifestyle choices can improve your self-concept? Give two detailed answers.
7. Physical performance is closely related to food choices. What are three things to remember about the relationship between nutrition and performance?
8. Describe what you think were the two most important pieces of information in this reading about nutrition.

ACTIVITY # 2

FOOD LOG

Name: _____ Date: _____ Period: _____

Let's learn about YOUR nutrition. Keep a log of everything you eat for a week. Keep track of your serving size, and be specific so your calories are correct (i.e. – avoid saying “a bowl of cereal,” since bowls come in many sizes). There is a sample calorie chart on the back, but you may use other resources if your food is not listed. Compare your daily serving sizes to the USDA recommendations. How do you measure up?

Breakfast	Serving Size	Calories
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Saturday		
Sunday		
Lunch	Serving Size	Calories
Monday		
Tuesday		

Wednesday		
Thursday		
Friday		
Saturday		
Sunday		
Dinner	Serving Size	Calories
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Saturday		
Sunday		

Snacks	Serving Size	Calories
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Saturday		
Sunday		

Name: _____ Date: _____ Period: _____

Breakfast type items	Serving Size	Calories
Blueberry muffin	1	160
Nutri-Grain strawberry bar	1 bar	140
Oatmeal, maple & brown sugar, instant	1 packet	160
Cheerios	1 cup	110
Frosted Mini-Wheats	5 biscuits	175
Honeycomb	1 cup	86
Rice Krispies	1 cup	102
Trix	1 cup	88
Bagel	1 large	365
Pancake, frozen	1	92
Entrée items	Serving Size	Calories
Cheese pizza	1 medium slice	290
Taco Bell 7-layer burrito	1	520
Bean burrito	1	225 - 400
Enchiladas with cheese	1	320
Cheese quesadilla	1	550
Nachos with beef, beans, cheese & peppers	1	570
Hamburger, double patty, large, with condiments, vegetables and mayonnaise	1	942
Cheeseburger, large with vegetables and condiments	1	480
McDonalds Big Mac	1	590
Hamburger, single large patty, condiments, vegetables and mayonnaise	1	560
Ham & cheese sandwich	1	350
Turkey with mayonnaise sandwich	1	330
Spaghetti & meat balls with tomato sauce, prepared	1 ½ cup, 2 oz meat	350
Fried chicken	1 piece	225 - 325
Crispy chicken salad with honey mustard	1 salad	700
Caesar salad, with chicken, no dressing	1	220
Fruits and Vegetables (grains)		
Apple-raw with peel	1 medium	95
Banana	1 medium	105
Carrots, raw	½ cup	25
Green peppers	10 strips	5
Mango	½ fruit	67
Mashed potatoes	½ cup	85-115
Orange juice	½ cup	56

Pear	1 medium	105
Refried beans, canned	½ cup	119
Rice	½ cup	100
Tomato	1 medium	20
Beverages	Serving Size	Calories
Tap water	12 ounces	0
Coca-Cola Classic	12 ounces	98
Root beer	12 ounces	160
7-Up	12 ounces	150
Sunny Delight	12 ounces	195
Gatorade Thirst Quencher	12 ounces	96
Whole milk	1 cup	146
Reduced fat 2% milk	1 cup	138
Lowfat 1% milk	1 cup	102
Nonfat milk	1 cup	90

Activity # 3

Analyzing YOUR Eating

Name: _____ Date: _____ Period: _____

1. What was interesting about writing down everything you ate for the week? Give 2 detailed answers.
2. What was challenging about writing down everything you ate for the week? Give 2 detailed answers.
3. Were there large differences in choices/serving sizes between days? Why or why not?
4. Do you think what you ate during the week negatively or positively influenced your weight? Why or why not?
5. Do you think what you ate during the week negatively or positively influenced your self-concept? Why or why not?
6. Do you think what you ate during the week negatively or positively influenced your physical performance? Why or why not?
7. Could you tell by your urine if you were sufficiently hydrated throughout the week? Were you? Why or why not?

Activity # 4

Instructional Planning & Support

The idea to deliver this content is a “Clue Egg Hunt.” Feel free to use other creative ways to implement movement.

Materials Needed

- Three dozen plastic Easter eggs to hide the clues (color-coded)
- Printed quizzes on clipboards with pencils for each group
- Printed laminated clues in each egg (multiples)

Activity # 5

PHYSICAL ACTIVITY QUIZ

Name of group members: _____

Date: _____

Period: _____

Directions: Today you're going to go on an egg hunt. You're going to find every color egg your group can find. Each egg contains a clue to help you fill out your quiz. The eggs will be spread out all over, so your group will have to actively look to find all of the clues. One person will stay with the clipboard, but that person will rotate so everyone has a chance to be active today. The first group to correctly finish the quiz is the winner.

1. What does 'Physical Activity' mean?
2. List 5 ways physical activity affects weight control.
3. List 6 ways physical activity affects self-concept.
4. List 3 ways physical activity affects physical performance.
5. List how physical activity affects everyone in the group (one from each member)
6. Where do you get most of your physical activity? List one for each member of the group.
7. What was the most important piece of information you learned during this activity?

Clues to Cut Up and Laminate

(Print more than the number of groups you'll have)

‘Physical Activity’ is defined by the CDC (Centers for Disease Control) as “any bodily movement that is produced by the contraction of skeletal muscle and that substantially increases energy expenditure.”

Physical activity affects weight control by burning calories.

Physical activity affects weight control by increasing muscle mass/changing body composition.

Physical activity affects weight control by increasing metabolism.

Physical activity affects weight control by regulating appetite.

Physical activity affects self-concept by releasing endorphins (feel good hormones)

Physical activity affects self-concept by increasing blood flow, increasing oxygen flow all over the body.

Physical activity affects self-concept by increasing energy.

Physical activity affects self-concept by improving mood/attitude.

Physical activity affects self-concept by increasing confidence.

Physical activity affects self-concept by achieving specificity (accomplishing a goal/shape through exercise).

Physical activity affects physical performance by increasing ability to perform longer (increased muscle mass/endurance).

Physical activity affects physical performance by strengthening the heart and lungs.

Physical activity affects physical performance by increasing time to fatigue.

Physical activity affects physical performance by training the body – the more regular the frequency, performance becomes easier.

Activity # 6

Name: _____ Date: _____ Period: _____

Assessment:

Using what you've learned, write a five paragraph expository essay explaining the effects of nutrition and participation in physical activity on weight control, self-concept, and physical performance.

If you need more space to write use a piece of notebook paper and attach it to the back of this paper.



High School Courses 1-4

Introduction

High school physical education courses continue to provide students the opportunity to learn content from those standards that address performance-related nutrition. This set of instructional materials provides teachers with specific lessons that can be used immediately in the instructional setting, as well as providing linking points for further lesson development. A description of the content standards that relate to performance-related nutrition is included.

These materials were developed to serve as an entry point for high school teachers and their students. Students who are now entering high school, have diverse backgrounds in learning the content of performance-related nutrition, and will display an uneven approach to the content for several years until standards-based physical education has a strong foundation in both the elementary and middle Grades. These materials have been designed to meet those needs.

The instructional materials provide a plan for addressing performance-related nutrition in each of the four high school courses. One complete lesson for each course is provided and two additional topics are identified for further development by teachers. In addition, reinforcing lessons can be easily developed and implemented based on the content addressed here.

This material was developed by the California Department of Education under contract with the California Department of Public Health's *Network for a Healthy California*. Funding was provided by the United States Department of Agriculture, Supplemental Nutrition Assistance Program (formerly the Food Stamp Program). These institutions are equal opportunity providers and employers. In California, food stamps provide assistance to low-income households, and can help buy nutritious foods for better health. For food stamp information, call 877-847-3663. For important nutrition information visit www.cachampionsforchange.net

Content Standards for High School Courses 1-4 Related to Performance-Related Nutrition

Overarching Standard 2: Students achieve a level of physical fitness for health and performance while demonstrating knowledge of fitness concepts, principles, and strategies.

High School Course 1

- 2.7 Participate in enjoyable and challenging physical activities that develop and maintain the five components of physical fitness.
- 2.8 Meet health-related physical fitness standards established by a scientifically based health-related fitness assessment.
- 2.9 Use physical fitness test results to set and adjust goals to improve fitness.
- 2.9 Develop and implement a one-month personal physical fitness plan.
- 2.8 Analyze consumer physical fitness products and programs.

High School Course 2

- 2.10 Justify the use of particular physical activities to achieve desired fitness goals.
- 2.11 Develop and describe a physical fitness plan that enhances personal health and performance in future leisure and workplace activities.
- 2.8 Explain how to evaluate consumer physical fitness products and programs.
- 2.9 Identify and evaluate ergogenic aids that claim to enhance body composition, appearance, physical fitness, and performance.

High School Course 3A Adventure/Outdoor Activities

- 2.1 Participate in adventure/outdoor activities that improve health-related physical fitness.

High School Course 3B Aerobic Activities

- 2.2 Identify and achieve a personal level of excellence in physical fitness.

High School Course 3C, 3D, 3E Individual and Dual Activities, Dance, Aquatics

- 2.1 Meet physical fitness standards that exceed those of a scientifically based health-related fitness assessment.

High School Course 3F Weight Training and Fitness

- 2.1 Establish a set of personal physical fitness goals, using the principles of training, and create a strength-training and conditioning program.

High School Course 4A and 4D Advanced Adventure/Outdoor and Dance

- 2.1 Achieve a level of fitness that improves health and performance and provides opportunities for enjoyment and challenge in an adventure/outdoor activity or dance activity.

High School Course 4B Advanced Aerobic Activities

- 2.1 Identify and achieve levels of personal excellence in health-related physical fitness.

High School Course 4C Advanced Individual and Dual Activities

- 2.1 Develop personal physical fitness standards that exceed those of a scientifically based health-related physical fitness assessment.

Performance-Related Nutrition Instructional Materials

High School Course 1

Hydration in General as Related to Performance

- The general importance of water and how it affects performance (Lesson Provided - High School Course 1 Lesson Plan)
- The metabolic effects of water and detriments of dehydration.
- How proper hydration affects/effects physical and mental performance.

High School Course 2

Ergogenic Aids as they Relate to Performance

- The comparison of Water vs. Electrolyte Drinks vs. Vitamin Drinks. (Lesson provided – High School Course 2 Lesson Plan)
- Effect of Diet Pills, Steroids, Creative on physical and mental performance as well as overall health.
- Consumer information on Protein Powders, Protein Bars, Carbohydrate Gels, Vitamin Packs. Do you need them?

High School Course 3

Foods that Provide the Nutrition Needed for Performance

- Comparing nutritious readily available foods consumed prior to activity. (Lesson provided – High School Course 3 Lesson Plan)
- Psychological/emotional/social factors which impact nutrition choices.
- Creating a shopping list of nutritious foods to have readily available.

High School Course 4

Nutritional Needs to Meet Individual Performance Goals

- Evaluating Caloric Intake Needs for the High School Activity Chosen. (Lesson provided – High School Course 4 Lesson Plan)
- Nutritional needs Before, Day Of, & After Physical Performance.
- Becoming an informed consumer of nutrition myths, hoaxes, and rumors.

High School Courses 1-4 Lessons

Running & Nutrition Reflection

(Adaptable for each of the four high school courses)

High School Overarching Standard:

Achieve a level of fitness for health and performance while demonstrating knowledge of fitness concepts, principles, and strategies.

Objectives

- Students participate in activities that will contribute to improving their overall health and physical performance.
- Students evaluate nutritional needs related to their health and physical performance.
- Students will become educated and informed consumers of nutritional products (beverages and foods and ergogenic aids) which will affect/effect their overall health and physical performance.

Pre-Assessment (Collect evidence of student knowledge and behavior)

Have the students complete a one mile run for time, trying to achieve their Healthy Fitness Zones (HFZ) (see FITNESSGRAM® information for HFZ for girls and boys). Do NOT tell the students ahead of time that they will be running that day, as you want them to be honest in what they would eat or drink on a typical school day. Make sure that the students are aware of their HFZ, so that they can try to achieve their fitness goal.

After running the mile, have students fill out the **Running & Nutrition Reflection**. This form can be modified to reflect the data the teacher wishes to collect on student knowledge and behaviors regarding the specific performance-related nutrition topic.

From the information that the students give on the written reflection, data will be generated which will guide the nutrition lessons to be taught. For the next two to three weeks, give nutrition mini-lessons (course emphasis).

Post-Assessment (Collect evidence for decision making on future lessons)

After the Nutrition Mini-Lessons have been taught, have students do another one mile run. The post-assessment collection of evidence should be based on new information and decision making that have come as a result of the instruction they have received.

On the post-assessment one mile run day, have students fill out the **Running & Nutrition Reflection** again, and have them list what changes they have actually made, or whether they actually made changes at all. Again, encourage them to BE HONEST.

Modifications for Alternative Learners (English Language Learners, Students with Learning Disabilities, Students with Physical Disabilities, 504 Plans, etc.):

- With ALL written assessments, provide an opportunity for students to work with other students to complete the written work.
- Have them share verbal answers with each other, and then write their verbal explanations, or have another student help with the written explanations.
- Students with physical disabilities can participate as per their own abilities, so that they can work towards increasing and maintaining their own fitness.

Running and Nutrition Reflection Sample

Name: _____ Day and Date _____

Today's Run Time: _____

List everything you ate and drank today in the chart below. Please be honest about what you chose, even if you know your choices could have better.

What foods/drinks	How Much	# of Calories

Use the back of this paper to record more items if you need more space.

Answer the questions below honestly. Use a scale from 1=worst to 5=best to describe your responses.

1. How did you feel about the choices you are making concerning the food you eat on school days?
2. What have you learned about what you eat and how it can impact performance?
3. Do you notice changes in how you feel when you are active now that you know more about the fuel your body uses?
4. How quickly did you recover from the run today? Why?
5. What kind of effort did you give today during the run?

Answer as completely as possible. Use the back of this paper if you need more room

6. Explain how what you ate and/or drank today may have positively or negatively affected your performance.

7. List the changes you can make in your food and drink choices now that you know more about nutrition.

High School Course 1: Hydration as Related to Performance

General importance of water and how it affects performance

Lesson Objectives

- Students will participate in a moderate to vigorous physical activity (MVPA) by walking quickly or jogging for 20 minutes (or more) around a track or set course.
- Students will analyze hydration and heat-related illness information.

Materials Needed

- Hydration and Heat-Related Illness Information Cards (next page)
Photocopy the Hydration and Heat-Related Illness Information cards with the Reflection Prompts on the back of each card. Then cut and laminate the cards for durability. Prepare twice as many cards as you have students in the class, as students will keep the information cards as they complete laps.
Example: 40 students = 4 sets of the 20 cards
- A ¼ mile track (or square or round course of similar distance).
- Optional - Stopwatch or timer if you are keeping track of how many minutes for participation, otherwise, you can set a goal of a certain number of laps completed.

Learning Activities

- Explain to students that they will be walking quickly or jogging for 20 minutes (or more) and should walk or jog with a partner (or a group of three for an odd number of students). The teacher may also select partners, depending on the general atmosphere of your class, and for accommodating English Language Learners, Special Education, 504 Plan students, Students with Disabilities, etc.
- At the start of the walk/jog, each pair/group of students will be given an information card which they must:
 - Read through the information thoroughly.
 - Thoughtfully discuss the Reflection Prompts on the back of the card.
 - Create ONE summary sentence from the information on the front of the card, to be verbally expressed to the teacher, once the lap is completed.
- Once the lap is completed, and pairs of students have given their summary sentence, the students are given another information card, and students walk/jog another lap. This process repeats until desired laps are completed or time is finished.

NOTE: If students start standing in line, as they are waiting to tell you their summary sentence, tell them to remember their summary sentence and then hand them another card, so that you don't have students standing and waiting in line.

Closure

- At the end of the class period, provide time for reflections and questions that the students may have. This can be accomplished by putting two student groups together to discuss questions as a small group. After allowing students an opportunity to reflect, the teacher should guide the discussion.

Reflection Prompts

(Teacher may create additional prompts)

Place these three prompts on the back of each card

What did you learn about water from reading the card?

Please create a sentence that summarizes the information on the front of this card. Be ready to share your summary sentence.

What information on the card would you like to learn more about?

Hydration and Heat-Related Illness Information 1

When we move, the working muscles in our body generate heat, which is transported around the body via the blood. The more we move and exercise, the more heat we generate. As the body temperature increases, the blood vessels near the skin open up and the sweat glands work harder. The evaporation of sweat from the body's surface and the release of heat from the blood cool the body. In this way, the body tries to maintain its ideal temperature of 98.6° F (37°C).

Hydration and Heat-Related Illness Information 2

Exercising in hot and/or humid conditions may cause the body to sweat heavily and water is therefore lost from the blood. If we do not replace this loss by drinking fluids, the blood volume will be reduced. Because the heart is sending a constant supply of oxygenated blood to the exercising muscles, there will be an increased demand on the heart, which may cause a greater risk of an accelerated heart rate, excessive fatigue, increased skipped beats and dizziness.

Hydration and Heat-Related Illness Information 3

Some ways to prevent heat illnesses include the following:

DRINK WATER

- 6 to 8 ounces before exercise.
- Every 15-20 minutes during exercise and following the cool-down.
- WATER is the best fluid replacement for exercise lasting 1 hour or less.

Hydration and Heat-Related Illness Information 4

It is important to let your body gradually get used to higher temperatures. This means take it easier and exercise for a shorter period of time when the weather is hot and humid. Cut back your normal routine as the thermometer rises, and then gradually work back up to a longer workout over the next few weeks. Warm up in the shade, do your stretches there, if possible. As you acclimate to the heat, the body's core (internal) temperature will not rise as much during exercise and the metabolic rate at rest will decrease. Your body will also learn to sweat more in response to exercise, helping to cool itself off. Try to exercise in the shade as much as possible by choosing shady tree lined streets for walking and jogging.

Hydration and Heat-Related Illness Information 5

Light-colored, loose fitting clothing that is comfortable will help promote heat loss and evaporation of body heat. Keep in mind that open-mesh jerseys and tank tops will cause overexposure to the sun. A brimmed hat can help shade your face. Always use a good sunscreen product with a Sun Protection Factor (SPF) of at least 30 (waterproof is best since you will be sweating) to prevent sunburn. A wet bandana or ice pack scarf around the neck can also help with staying cool.

Hydration and Heat-Related Illness Information 6

One of the biggest risks of exercise in hot weather is dehydration. For this reason it is important to drink plenty of WATER while exercising. In hot weather, it is a good idea to drink plenty of water (two eight ounce cups) an hour or two before starting to exercise. Follow this with another cup every 15-20 minutes during exercise and an additional cup or two within a half hour after exercising. The body can lose up to a quart of water an hour while exercising, so drink up.

Hydration and Heat-Related Illness Information 7

If you are competing in strenuous activity for more than 60 minutes or it is hot/humid weather, a sports drink with 5 percent to 8 percent carbohydrate content (14-18 grams carbohydrate per 8 oz.) and some electrolytes, such as sodium and potassium is recommended. Avoid sodas or other beverages too high in carbohydrate, because the dense sugar content slows fluid absorption and impairs rehydration. A hot weather hint: carrying a bottle of frozen water is a good idea. It will supply you with cold water and will help keep you cool.

Hydration and Heat-Related Illness Information 8

Heated pools can cause a person to become dehydrated and overheated during the summer. The water temperature should ideally be 75 to 78 degrees F (and no more than 80 degrees) for vigorous workouts. You will still be sweating on hot days – even though you are in the water, and it is important to drink plenty of fluids as advised above, and listen carefully to your body.

Hydration and Heat-Related Illness Information 9

It is important to know the signs of heat exhaustion and heat stroke. These can occur when your body can no longer cool itself and your internal body temperature begins rising. Listen to your body carefully when exercising in warmer weather. This is NOT the time to push on if the following symptoms occur: Weakness, Dizziness, Fatigue, Nausea, Headache, Sweating Stops, Body Temperature Increases past “normal” (98.6°F) If you become nauseated or dizzy, rest immediately in the shade and drink plenty of fluids until you begin to feel better.

Hydration and Heat-Related Illness Information 10

Be sure to stretch in the shade or a cool area after exercise, and drink fluids to help replace water loss during the exercise. Do NOT take a hot bath or shower right after exercising, or go into a sauna, since the risk of fainting and heart attacks are increased from the heat causing a sudden drop in blood pressure.

Hydration and Heat-Related Illness Information 11

People who are very underweight, overweight, pregnant, or an older adult, should consult with their doctor on recommendations for exercising in the heat. You should not go above a moderate intensity level (60 to 70 percent of predicted maximum heart rate) when exercising in the heat. Rest frequently and drink plenty of water before, during, and after exercise.

Hydration and Heat-Related Illness Information 12

What you **SHOULD** do when exercising in the heat:

Use common sense and don't attempt strenuous activities that your body is not accustomed to. Stick to exercises that you are very familiar and comfortable with.

Wear light, loose fitting clothes that can breathe. If your outdoor activity produces a lot of perspiration, consider clothing that is designed to evaporate the sweat away.

Hydration and Heat-Related Illness Information 13

The best prevention against dehydration is adequate fluid replacement before, during and after exercise. Fluid requirements rarely keep pace with body requirements and sweat losses. However, as long as water consumption equals sweat loss, dehydration can be prevented.

Hydration and Heat-Related Illness Information 14

What you should **NOT** do when exercising in the heat:

Don't try to diet by sweating: Excessive perspiration is not the key to weight loss. Any decrease in the scale would simply be a result of water loss, not fat reduction.

Don't adopt the "no pain, no gain" motto: Ignoring your body's signals could be dangerous. Heat-related illnesses come with warning signs. Be sure to learn how to recognize them and what actions to take.

Hydration and Heat-Related Illness Information 15

What you should do when exercising in the heat:

Make sure to drink plenty of liquid when swimming. Just because your body is surrounded by water does not mean that you are well-hydrated. As with any land exercises, you need to regularly replenish lost fluids when in the pool.

Transition to lower temperature gradually. Don't go from being extremely hot and sweating excessively right into an ice cold, air-conditioned environment.

Hydration and Heat-Related Illness Information 16

To avoid heat-related illnesses, keep these basic precautions in mind:

Drink plenty of fluids. Your body's ability to sweat and cool down depends on adequate re-hydration. Drink plenty of water while you're working out — even if you don't feel thirsty. If you're planning to exercise intensely or for longer than 90 minutes, consider drinking a sports drink with 5 percent to 8 percent carbohydrate content (14-18 grams carbohydrate per 8 oz.). These drinks can provide electrolytes for your body which are lost during heavy sweating.

Hydration and Heat-Related Illness Information 17

Stop exercising at the first hint of a heat-related illness. Signs and symptoms may include: Weakness, Headache, Dizziness, Muscles Cramps, Nausea or Vomiting, and/or a Rapid Heartbeat. If you suspect a heat-related illness, get out of the heat. Drink water, and wet and fan your skin. Regular exercise is important – but don't let your workouts put your health at risk.

Hydration and Heat-Related Illness Information 18

Humans regulate body temperature through a process known as thermal balance - the regulation of the production of heat and the loss of heat. The human body gains or loses heat as a result of four heat exchange processes - convection, conduction, radiation and evaporation.

Of the four processes, the greatest amount of heat loss occurs through evaporation which takes place through sweating. Profuse sweating is the most effective means of losing heat and cooling the body. However, cooling only takes place when sweat evaporates from the skin.

Hydration and Heat-Related Illness Information 19

Anyone who exercises in the heat should be familiar with four symptoms of overexposure to the heat: 1) Dehydration; 2) Heat Cramps; 3) Heat Exhaustion, 4) Heat stroke illness can be prevented, through proper conditioning, gradual acclimatization, and adequate fluid replacement. Everyone needs to think ahead, and plan for special precautions when exercising in the heat.

Hydration and Heat-Related Illness Information 20

When exercising in the heat, you SHOULD eat regularly. The heat can decrease your appetite, but it's important to eat regularly. Try to eat small meals 5-6 times per day. Include lots of fruits and vegetables. Aside from being nutritious, fruits and vegetables also tend to help with hydration.

When exercising in the heat, you SHOULD drink plenty of fluids. It's extremely important to stay hydrated. Drink water often and be sure to drink throughout the day (stick to non-caffeinated beverages, preferably water). Also, drink 15-20 minutes before beginning your workout and every 15-20 minutes throughout the exercise.

High School Course 2: Ergogenic Aids as Related to Performance

The Comparison of Water vs. Electrolyte Drinks vs. Vitamin Drinks

High School Course 2:

Standard 2.9: Identify and evaluate ergogenic aids that claim to enhance body composition, appearance, physical fitness, and performance.

Ergogenic aids: Substances, devices, or practices that may enhance an individual's mental or physical performance.

This lesson is the second in a ten lesson sequence designed to assist students to learn the content in this standard.

Lesson Objectives

- Students will analyze the nutritional value of various ergogenic beverages.
- Students will participate in activity stations designed by the teacher (resistance equipment stations, FITNESSGRAM® practice stations, aerobic activity stations, skill practice stations, etc.) Activity stations should provide students with the opportunity to learn selected content from High School Course 2.

Materials Needed

- Collect the labels from a variety of 20-ounce vitamin, mineral, electrolyte, and/or ergogenic beverages. Students may be asked to assist in the collection of the labels several days before the lesson. Collect labels/information from 20-ounce containers, as students will need to analyze similar amounts for accurate comparisons. Examples of ergogenic beverages include: Gatorade®, Vitamin Water®, SoBe® Life Water®, Monster® drinks, etc.
- You will need many different labels to equal slightly more than half the students in the largest class, providing each student with their own label (Example: if your largest class is 40 students, then you should have 23+ different labels). There should be enough varieties of beverage labels so that each student can analyze at least four different types of beverages. May also want to have a comparison with tap water since free and relates to previous lessons on water needs.
- The two page **What's in YOUR Drink???** worksheet (printed front to back) to be given to EACH student, so that each student can collect their own information on four different labels, and each student can write their own reflections.
- Provide several copies of the **Vitamins and Minerals Table** to place near labels, so that students can be reminded of the vitamins and minerals and their functions. This will also provide a prompt for what students should be listing on their worksheet.
- Design physical activity stations that address the current needs of the students based on data collected from fitness assessment protocols. Equipment for each station will be determined by the station design.

Implementation

- Explain the **What's in YOUR Drink???** worksheet, so that students understand what they should be writing when they are at the label analysis station.
- Explain that each bottle is 20 ounces, and that there *MAY* be only 8 ounces in a serving - - they should check the serving size of each drink. IF the serving size is 8 ounces that means that there are actually 2.5 SERVINGS per bottle. Nobody just drinks HALF of a bottle, so that means that a typical PORTION (per bottle) is actually 2.5 SERVINGS. Remind students they MAY have to multiple by 2.5, if labels do NOT list per bottle, but rather, per serving.
- Set up a variety of physical activity stations, so that half of the students are participating in the activity, as the other half are analyzing ergogenic beverage labels. Allow for 2-3 minutes per station, so that students in the middle who are writing can get at least part of a label's information written, before having to rotate to an activity. Make sure to tell students to write the name of beverage they are analyzing first, so that they can continue their label analysis later if not completed after the first rotation.
- Allow plenty of time for English Language Learners and students with disabilities to complete the label analysis. Encourage peer assisting and partner analysis of labels.

Closure

- At the end of the class period provide time for discussion, reflections, and questions that the students may have regarding unfamiliar terms and/or words. It is also important to provide an opportunity to share the discussion questions either with a partner, in small groups, or as a teacher-led question and answer session for the entire class. . In addition, set the stage for future learning by telling students that the next lesson will provide opportunities to use the data collected today to examine some interesting relationships. For example, evaluating what we think we need to get from our drinks (that we cannot consume through food) compared to what our bodies really require, as well as what influences our thinking on these ideas.

What's in YOUR Drink???

Name: _____ Date: _____ Period: _____

DIRECTIONS: Compare the labels from water, electrolyte and vitamin drinks to see what they contain.

Name and Type of Drink	Price of this bottle	Price per ounce	Total Calories (per bottle) (Most drinks list the total per bottle)	Total Carbohydrate (per bottle) % daily value and Grams (g)	List vitamins & minerals in this drink and % daily value for vitamins & minerals (per bottle)	Identify the first 3 ingredients in this beverage (Fructose, Glucose, Sucrose, Dextrose and Corn Syrup are all names for "Sugar")
EXAMPLE 1. Aquafina® Drinking Water			0	0%	Sodium = 0%	Water
EXAMPLE 2. SoBe® LifeWater® (Pomegranate Cherry)			100	8% 25 g	Sodium = 4% Vitamin C = 250% Vitamin E = 50% Niacin (B ₃) = 25% Vitamin B ₆ = 25% Vitamin B ₁₂ = 25%	Filtered Water Sugar, Natural Flavor
3.						
4.						
5.						
6.						

Analyzing the Data

Name: _____ Date: _____ Period: _____

1. Which drink has the highest price per ounce? _____
2. Which drink has the most calories per bottle? _____ per ounce? _____
3. Which drink has the lowest number of calories per bottle? _____ per ounce? _____
4. Which drink has the highest amount of carbohydrates? _____
5. Which drink seems to have the highest vitamin and/or mineral content? _____
6. Which drink seems to have the lowest vitamin and/or mineral content? _____
7. Which drinks had one **or** two of the first three ingredients listed as “sugar.” (Remember the names for “sugar”: fructose, glucose, sucrose, corn syrup, dextrose, etc.). _____

8. Keeping in mind that it is best to meet your vitamin and minerals through a variety of foods, which beverage would be the best overall choice to drink throughout the day?

9. If you were doing high intensity exercise (running) for over one hour which drink would be the best? _____
10. If you are exercising for just a half hour which drink would be best? _____

For Extra Credit: Analyze the PowerAde® (Orange) label listed below. Remember, there are 2.5 servings per bottle, so you will need to multiple ALL listings by 2.5 to get the total per bottle.

Type of Drink	Total Calories (per bottle) (multiple the serving by 2.5 to get total)	Total Sodium (per bottle) % daily value	Total Carbohydrates (per bottle) % daily value	List Vitamins or Minerals in this drink and % daily value for each Vitamin or Mineral (per bottle)	List the 1 st 3 ingredients (Fructose, Glucose, Sucrose, Corn Syrup, and dextrose are all names for Sugar)
PowerAde® (Orange)					

LABEL INFORMATION 20 ounces per bottle

Serving Size = 8 ounces

Total Servings = 2.5 per bottle (EACH serving X 2.5 = TOTAL per bottle)

Calories per serving = 60 calories

Sodium per serving = 55 mg (2% Daily Value)

Carbohydrates per serving = 17 g (6% Daily Value)

Vitamins: B₃ (Niacin) (10%); B₆ (10%); B₁₂ (10%)

Minerals: Sodium 55mg (2%), Potassium 30 mg (1%)

Ingredients: Water, High Fructose Corn Syrup, Maltodextrin (Glucose Polymers), Citric Acid, Natural Flavors, Salt, Potassium Citrate, Modified Food Starch, Coconut Oil, Potassium Phosphate, Sucrose Acetate Isobutyrate, Yellow 6, Niacinamide (Vitamin B₃), Yellow 5, Pyridoxine Hydrochloride (Vitamin B₆), Cyanocobalamin (Vitamin B₁₂)

Vitamins and Minerals

VITAMINS	FUNCTION	MINERALS	FUNCTION
Fat-Soluble Vitamins (A, D, E, K)	Need fat source for easy absorption	Calcium	Aids in bones, teeth, blood clotting, nerve & muscle function
Vitamin A	Aids in vision, formation & maintenance of skin	Chloride	Aids in nerve & muscle function, & helps water balance
Vitamin D	Aids in growth & formation of bones/teeth	Magnesium	Aids in bone growth & nerve, muscle & enzyme function
Vitamin E	Prevents oxidative damage to cell membrane	Phosphorus	Aids in bones, teeth, and energy transfer
Vitamin K	Important in helping with blood clotting	Potassium	Aids in nerve and muscle function
Water-Soluble Vitamins: (B Complex & C)	Need water source for easy absorption	Sodium	Aids in nerve and muscle function & water balance
Thiamin (B ₁)	Functions as coenzyme & aids in energy utilization	Chromium	Aids in glucose metabolism
Riboflavin (B ₂)	Involved in energy metabolism as part of a coenzyme	Copper	Aids in enzyme function & energy production
Niacin (B ₃)	Facilitates energy production in cells	Fluoride	Aids in bone and teeth growth
Folate (Folic Acid)	Functions as a coenzyme to aid protein synthesis	Iodine	Aids in thyroid hormone formation
Vitamin B ₁₂	Aids red blood cell forming & nucleic acid synthesis	Iron	Oxygen transport in red blood cells & enzyme function
Vitamin B ₆	Aids red blood cell forming & protein metabolism	Manganese	Enzyme function
Biotin	Coenzyme in fatty acid and glycogen synthesis	Molybdenum	Aids in energy metabolism
Pantothenic Acid	Aids in carbohydrate, fat, and protein metabolism	Selenium	Works with Vitamin E
Vitamin C	Aids maintenance of bone, capillaries, and teeth	Zinc	Enzyme function, aids in growth

High School Course 3: **Foods that Provide the Nutrition Needed For Performance Comparing Nutritious Readily Available Foods Consumed Prior to Activity**

This lesson is the first in a series of lessons designed to assist students in learning the content related to the selection of nutritious snacks to fuel physical activity.

Lesson Objectives

- Students will collect and compile the nutritional value of various readily available snacks.
- Students will participate in activity stations designed by the teacher (resistance equipment stations, FITNESSGRAM® practice stations, aerobic activity stations, skill practice stations, etc.) Activity stations should provide students with the opportunity to learn selected content from high school course 3.

Materials Needed

- Collect the labels from a variety of snack foods that are 1-3 ounces in size (30-65 g.). Students may be asked to assist in the collection of the labels several days before the lesson. Students will analyze similar sizes for accurate comparisons. Examples of snacks include: protein or carbohydrate bars, trail mix, different types of 100 calorie packs, etc.
- You will need many different labels to equal slightly more than half the students in the largest class, providing each student with their own label (Example: If your largest class is 40 students, then you should have 23+ different labels). There should be enough varieties of snack labels so that each student can analyze at least four different types of snacks.
- The two page **What's in YOUR Snack???** worksheet (printed front to back) to be given to EACH student, so that each student can collect their own information on four different labels, and each student can write their own reflections.
- Provide several copies of the **Vitamins and Minerals Table** to place near labels, so that students can be reminded of the vitamins and minerals and their functions.
- Teacher-designed stations according to the class needs during the current coverage of content standards should be designed in a circular or square rotation, so that half of the students are on the outside participating in activity, while the rest of the students are analyzing a beverage label on the inner portion of the circle or square formation.

Implementation

- Explain the **What's in YOUR Snack???** worksheet, so that students understand what they should be writing when they are at the label analysis station.
- Set up a variety of activity stations, so that half of the students are participating in activity, as the other half are analyzing snack labels. Allow for 2-3 min. per stations, so that students in the middle who are writing can get at least part of a label's information written, before having to rotate to an activity. Make sure to tell students to write the name of the snack they are analyzing first so that they can continue their label analysis later if not completed after the first rotation.

- Allow plenty of time for English Language Learners and students with disabilities to complete the label analysis. Encourage peer assisting, and partner analysis of labels.

Closure

- At the end of the class period provide time for discussion, reflections, and questions that the students may have regarding unfamiliar terms and/or words. It is also important to provide an opportunity to share the discussion questions either with a partner, in small groups, or as a teacher-led question and answer session for the entire class.
- It should be emphasized that the optimal pre-exercise snack may differ from the “healthiest” choice of snack during the school day. The ideal pre-exercise snack should be low fat, low protein, low fiber and high carbohydrate and the amount of vitamins and minerals is not significant. Remember that carbohydrates are the preferred fuel for exercise and they require less time for digestion and absorption. Whereas, for a snack not related to exercise, one with more fiber, low in fat and fortified with some vitamins and minerals is appropriate.

What's in YOUR Snack???

Name: _____ Date: _____ Period: _____

DIRECTIONS: Collect information from the labels from different snacks to prepare for analyzing the information to learn more about pre-activity snack choices.

Name and Type of Snack	Total Calories (per Snack)	Total Fat Grams (g) (per Snack)	Total Carbohydrate Grams (g)	Total Protein Grams (g)	List Vitamins & minerals and the % daily value for each
SAMPLE 1. ZONE Perfect® Fudge Graham Bar	Total Calories 210 cal	Total Fat 7 g	Total Carbs. 23 g	Total Protein 14 g	Vitamin A = 35% Vitamin C = 100% Calcium = 20% Iron = 10% Vitamin E = 100% Thiamin = 25% Riboflavin = 50% Niacin = 50% Vitamin B ₆ = 50% Folate = 20% Vitamin B ₁₂ = 35% Magnesium = 10% Zinc = 25%
2.					
3.					
4.					
5.					
6.					

Name: _____ Date: _____ Period: _____

1. Which snack had the **most calories** (per snack)? _____
2. Which snack had the **least calories** (per snack)? _____
3. Which snack had the **most fat grams** (per snack)? _____
4. Which snack had the **least fat grams** (per snack)? _____
5. Which snack had the **most carbohydrate grams** (per snack)? _____
6. Which snack had the **least carbohydrate grams** (per snack)? _____
7. Which snack had the **most protein grams** (per snack)? _____
8. Which snack had the **least protein grams** (per snack)? _____

For Extra Credit: Analyze a snack from your favorite fast food restaurant. Nutrition information is available at ALL restaurants or online. Remember to look at the entire snack, NOT just a serving size, which may be different amounts.

Name and Type of Snack	Total Calories (per snack)	Total Fat Grams (g)	Total Carbohydrates Grams (g)	Total Protein Grams (g)	List Vitamins and minerals and the % daily value for each

Vitamins and Minerals

VITAMINS	FUNCTION	MINERALS	FUNCTION
Fat-Soluble Vitamins (A, D, E, K)	Need fat source for easy absorption	Calcium	Aids in bones, teeth, blood clotting, nerve & muscle function
Vitamin A	Aids in vision, formation & maintenance of skin	Chloride	Aids in nerve & muscle function, & helps water balance
Vitamin D	Aids in growth & formation of bones/teeth	Magnesium	Aids in bone growth & nerve, muscle & enzyme function
Vitamin E	Prevents oxidative damage to cell membrane	Phosphorus	Aids in bones, teeth, and energy transfer
Vitamin K	Important in helping with blood clotting	Potassium	Aids in nerve and muscle function
Water-Soluble Vitamins: (B Complex & C)	Need water source for easy absorption	Sodium	Aids in nerve and muscle function & water balance
Thiamin (B ₁)	functions as coenzyme & aids in energy utilization	Chromium	Aids in glucose metabolism
Riboflavin (B ₂)	Involved in energy metabolism as part of a coenzyme	Copper	Aids in enzyme function & energy production
Niacin (B ₃)	Facilitates energy production in cells	Fluoride	Aids in bone and teeth growth
Folate (Folic Acid)	Functions as a coenzyme to aid protein synthesis	Iodine	Aids in thyroid hormone formation
Vitamin B ₁₂	Aids red blood cell forming & nucleic acid synthesis	Iron	Oxygen transport in red blood cells & enzyme function
Vitamin B ₆	Aids red blood cell forming & protein metabolism	Manganese	Enzyme function
Biotin	Coenzyme in fatty acid and glycogen synthesis	Molybdenum	Aids in energy metabolism
Pantothenic Acid	Aids in carbohydrate, fat, and protein metabolism	Selenium	works with Vitamin E
Vitamin C	Aids maintenance of bone, capillaries, and teeth	Zinc	Enzyme function, aids in growth

High School Course 4: Nutritional Needs to Meet Individual Performance Goals: Evaluating caloric need for the chosen high school activity

Lesson Objectives

- Students will evaluate the caloric needs for their preferred activities (advanced adventure/outdoor activities, advanced aerobic activities, advanced individual and dual activities, or advanced dance).
- Students will construct a summary of their research findings to be shared with their classmates through written, verbal, or presentation format.

Materials Needed

- Each student should have a copy of the **Guiding Questions for Evaluating Caloric Needs Project** handout to guide them for their research project. These questions should be answered completely and the responses turned in with their completed report.
- A computer lab (if available), so that students can work on their research.
- Recommended resource for this activity is the following text:Sizer, F. and Whitney, E. 2008. *Nutrition: Concepts and Controversies, 11th ed.* Belmont, CA: Thomason Wadsworth.

Implementation

- Explain the Guiding Questions for Evaluating Caloric Needs Project handout, so students know what the expectations are. This handout should be turned in with the student's report. It is a guide to help students focus questions for their nutrition research.
- Explain that each student will be responsible for providing a report of their research findings either through written, verbal, or presentation format. In providing this flexibility, you are allowing students to express themselves in a manner that best suits their learning style.
- Guidelines for expectations on what a written report, verbal report, or presentation format report should look like should come from the teacher. Having the students complete the Guiding Questions for Evaluating Caloric Needs Project handout will help students to focus their report.
- Provide a clear timeline of when reports should be completed. Two weeks typically are a sufficient amount of time to complete the report.

Closure

- After reports are completed, provide time for students to present their research to the class. Allow them to be the experts. Provide plenty of opportunity for questions and class discussion, especially if there is unfamiliar information that is presented or information that is confusing or could be misleading.

Guiding Questions For Evaluating Caloric Needs Project

Directions

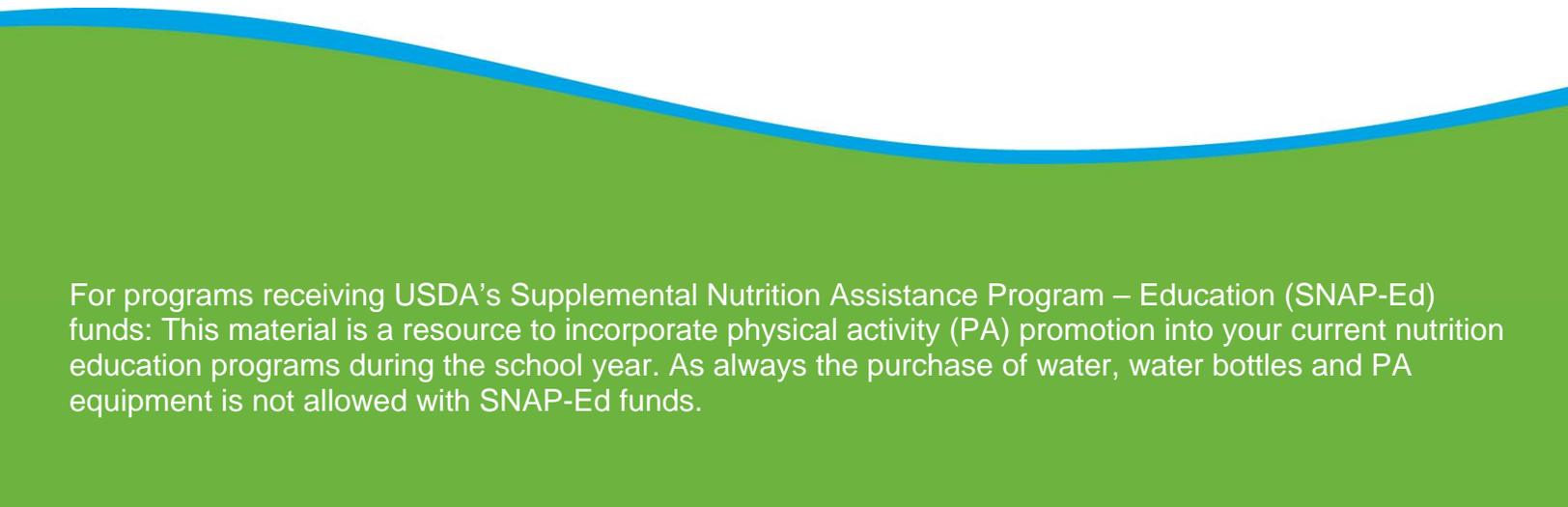
These questions serve as a guideline for information for your research. You are gathering as much information as possible to be able to report your findings to the class in a written, verbal, or presentation format. These notes **MUST** be turned in with your report.

Remember to list the sources where you found information. (Websites, books, magazines, etc.)

1. Which physical activity is the focus of your research?
2. Determine how many calories are expended during one hour of this activity.
3. What are the physical demands of your activity which may create a need for specific nutrients?
4. What are the recommendations for Americans as far as total calorie consumption and the percent calories from carbohydrate, fat, and protein to decrease risk of chronic disease?
5. Considering your calorie intake and your sport, do you meet the recommendations listed in number 4?
6. List five foods that you might choose to fuel your activity and explain why. Also, create a list of ten nutrient dense sources of carbohydrates.
7. How important is hydration (water intake) for your activity and what some guidelines for fluids when you participate in this activity for one hour or more?
8. What other important nutrition recommendations or suggestions are valuable to know for increased performance in your activity?
9. What are your sources for your information? Are they reliable & credible? How do you know?

REFERENCES

- 1.Sizer, F. and Whitney, E. 2008. *Nutrition: Concepts and Controversies*, 11th ed. Belmont, CA: Thomson Wadsworth.
2. The Centers of Disease Control Website
<http://www.cdc.gov/nccdphp/dnpa/healthyweight/assessing/bmi/index.htm>
3. Howley, E. T. and Franks, B. D. 2007. *Fitness Professional's Handbook*, 5th ed. Champaign, IL: Human Kinetics.
4. FITNESSGRAM® Healthy Fitness Zones. 2007. The Cooper Institute of Aerobics Research, Dallas, TX.
5. Heat-related illnesses information (High School Course 2 Lesson Plan)
http://ak.essortment.com/exercisinghotw_raop.htm



For programs receiving USDA's Supplemental Nutrition Assistance Program – Education (SNAP-Ed) funds: This material is a resource to incorporate physical activity (PA) promotion into your current nutrition education programs during the school year. As always the purchase of water, water bottles and PA equipment is not allowed with SNAP-Ed funds.