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“White House Campaign on
Childhood Obesity”
Science Lesson Plan

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**A daily news broadcast for High School and Middle School students
now under development by MacNeil/Lehrer Productions**



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“White House Campaign on Childhood Obesity” Science Lesson Plan

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Winter, 2010

Dear Educator,

the.News online video reports for *the.Gov* and *the.Sci* provide middle and high school students with a valuable exercise in social studies, language arts, and science with this **6:20** minute video report on Michelle Obama's child obesity campaign at www.pbs.org/newshour/thenews/themedic. * Correspondent, Antonio Neves, reports on the role of diet and exercise in developing a healthy lifestyle. Lesson plans for social studies, language arts and science are available to support this video in the "For Educators" section of the website. All videos and curricula have been informed by *the.News* instructional design that can be found on the website www.pbs.org/newshour/thenews. The curriculum includes content-based standards, discussion questions, student activities, vocabulary and primary reference sources. A complete transcript of each video report includes time codes to assist in isolating specific segments of the video and to augment the instruction of media literacy and multimedia production. All of this material is presented as options to fit teachers' instructional needs.

References to Larry Bell's "The 12 Powerful Words" are highlighted in **bold** in the lesson plans, in the "thought starter" questions on the home page and educator's page, and in the transcript (to denote where they are used in the video segment).

We have also added general topics to correlate to the lessons and video as well as concept based curriculum examples.

We welcome our partners at the Omaha Public Schools who have joined *the.News* in a special pilot project during the 09-10 school year. We are also developing a new authoring tool for students called *YOU.edit*, to launch in spring 2010. It will give students an online tool to remix the content of *the.News* reports, so they can create their own multimedia presentations. This editing tool will reside on our website so that it will be available to all students with an internet connection. It will be password protected so that it can serve as a viable educational asset that allows classroom teachers to assign multimedia projects within the security and content safety of *the.News* website. * (this video and lesson plans can also be found at *the.Sci* and *the.Gov*)

Answers to student "thought starter" questions listed below the video.

- #1. A combination of lifestyle choices is needed to reduce obesity and improve student's health.
- #2. eating fruits and vegetables, exercise, and always having breakfast; (also decrease calorie, saturated fat, salt intake and processed sugars)
- #3 food label; serving size

Sincerely,

Karen W. Jaffe
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White House Campaign on Childhood Obesity

This lesson was designed to support *the.News* video “White House Campaign on Childhood Obesity” The video can be found online at www.pbs.org/newshour/thenews/themedic

Grade Level: Grades 7–12

Omaha Public Schools Human Growth & Development Standards Grade 7

Standard 5 Concept 11: Health care is the responsibility of each individual.

Conceptual Lens: Change

Enduring Understanding: Diet and exercise, along with helpful information and tools, can affect a healthy lifestyle for American youth.

Content Areas: Science, Health, Math

Key Concept(s)

Students will learn how to calculate body mass index (BMI) and will learn basic nutritional and exercise requirements for teens. They will record the foods they eat during a week and their exercise level. After evaluating the data, they will develop a healthy meal and exercise plan. Students will be encouraged to work with their families throughout the lesson.



Objectives:

Students will

- Be able to calculate their own body mass index and use it to assess their weight.
- Record their weekly intake of foods and drinks and the amount of exercise done in a week.
- Calculate the amount of calories and nutrients in their food and **compare** these totals with required levels for children of their age and activity level.
- Calculate how many calories they burn through normal activities and exercise.
- **Evaluate** the data they obtain about their diet and exercise.
- **Formulate** a meal and exercise plan designed to foster a healthy weight and adequate nutrition and exercise levels.

Omaha Public Schools Mathematics Standards Grade 7–12

Pre-Algebra

Standard 1: Add, subtract, multiply, and divide decimals, fractions, and integers, including proper use of order of operations.

Standard 2: Convert values among fractions, decimals, and percents.

Standard 8: Apply the mathematics in this course to solve relevant real-life problems.

Omaha Public Schools Physical Education Standards Grades 7–12

Standard 3: Participates regularly in physical activity

Standard 4: Achieves and maintains a health-enhancing level of physical fitness



Omaha Public Schools Science Standards Grade 7

Standard 05: Develop an understanding of the structure and function of the human body.

Omaha Public Schools Science Standards Grades 9–12

Biology 1–2, AP Biology

Standard 04: Investigate the molecular basis of genetics and the influence of genetics on health

Key Vocabulary:

- **Aerobic:** exercise that works the heart and lungs
- **Body mass index (BMI):** a number derived from a person's weight and height that is a good indicator of body fat
- **Calcium:** element essential to building and maintaining bones and teeth
- **Calorie:** unit of measurement that expresses the energy value of food
- **Fat:** nutrient in food needed for nerve tissue and



hormones

- **Fiber:** substance found in plant foods that does not break down during digestion and aids in healthy digestion
- **Iron:** element essential for healthy red blood cells
- **Nutrition:** nourishment for the body
- **Obesity:** seriously fat or overweight
- **Protein:** component of plant and animal foods that helps build cells

Sources: All my own definitions derived from CDC, New Oxford American Dictionary, and TeensHealth

Lesson Topics:

- Obesity
- Health and Fitness
- Nutrition
- Exercise

Materials:

“White House Campaign on Childhood Obesity” from *the.Gov*, *the.Sci* and *the.Medic*

www.pbs.org/newshour/thenews/thesci
www.pbs.org/newshour/thenews/thegov
www.pbs.org/newshour/thenews/themedic

- Internet access
- Student Handouts
 - “Eats for a Week” chart
 - “Weekly Workout” chart

Time Frame:

Three to four class periods, one for background and research, a second (and third, if needed) to review the handouts and conduct additional research, and another to review students' meal and exercise plans.

McRel

Science (www.mcrel.org)

Level III (Grades 6–8)

Benchmark 6: Uses appropriate tools (including computer hardware and software) and techniques to gather, analyze, and interpret scientific data

- Uses techniques to gather scientific data
- Uses techniques to analyze scientific data
- Uses computer hardware to gather scientific data
- Uses computer hardware to analyze scientific data

Benchmark 8: Evaluates the results of scientific investigations, experiments, observations, theoretical and mathematical models, and explanations proposed by other scientists (e.g., reviewing experimental procedures, examining evidence, identifying faulty reasoning, identifying statements that go beyond the evidence, suggesting alternative explanations)

- Evaluates the results of scientific investigations by examining evidence



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Background:

Obesity: A Growing Problem

About one in three adults in the United States is obese, which means that they are significantly overweight. The rate for teens is nearly 20 percent. Being obese is more than just being fat. Those who are obese are more likely to develop diabetes, heart disease, certain cancers, and mobility problems. \$150 billion every year is spent to treat obesity-related conditions. The problem is so serious that first lady Michelle Obama has made it one of her priorities, launching a national campaign designed to combat childhood obesity called “Let’s Move!” The aim is to solve the childhood obesity problem in a generation. It’s a lofty goal, but one that’s important to all Americans. The campaign’s attack is four-fold:



- to ensure access to healthy, affordable food;
- to increase physical activity in schools and communities;
- to provide healthier food in schools; and
- to support parents with information and tools to make healthy choices for themselves and their families.

A valuable component of this effort is the letsmove.gov Web site, which offers a great deal of information for parents, teachers, children, and community leaders.

McRel

Science (www.mcrel.org)

Level IV (Grades 9–12)

Benchmark 3: Evaluates the results of scientific investigations, experiments, observations, theoretical and mathematical models, and explanations proposed by other scientists (e.g., reviewing current scientific understanding, using evidence to validate conclusions, examining the logic to determine which explanations and models are the best, examining the involvement of control groups, examining the adequacy of the sample)

- Evaluates the results of scientific investigations by reviewing current scientific understanding
- Evaluates the results of scientific investigations by using evidence to validate conclusions
- Knows that evaluating a proposed scientific explanation includes reviewing current scientific understanding
- Knows that evaluating a proposed scientific explanation includes using evidence to validate conclusion

Benchmark 4: Uses technology (e.g., hand tools, measuring instruments, calculators, computers) and mathematics (e.g., measurement, formulas, charts, graphs) to perform accurate scientific investigations and communications

- Uses mathematics to perform accurate scientific investigations
- Uses computers to perform accurate scientific investigations
- Uses formulas to perform accurate scientific investigations
- Uses charts to perform accurate scientific investigations



As an educator, you can help your students understand the problem of childhood obesity, **evaluate** their own food and exercise habits, and **formulate** a healthy plan of meals and exercise that can include the entire family.

Body Mass Index (BMI)

Healthy weight varies according to a person's age, height, and gender, so the best way to determine whether someone is overweight or obese is by calculating body mass index (BMI). BMI is a number derived from a person's weight and height that is a good indicator of body fat. Here's how to calculate BMI: Divide the weight in pounds by the height in inches squared and multiply that result by 703.

For example, 120 divided by 67^2 equals 0.0267. Multiply 0.0267 by 703 to get a BMI of 18.8.

For adults, a BMI below 18.5 is underweight, one between 18.5 and 24.9 is normal, 25.0–29.9 is overweight, and a BMI of 30 or greater is obese. Because children's growth varies by age and gender, a special chart is used to assess BMI. The Centers for Disease Control and Prevention offer BMI charts for boys and girls between the ages of 2 and 20 that you can download and use to **evaluate** BMI.

Boys: <http://www.cdc.gov/growthcharts/data/set1clinical/cj411023.pdf>

Girls: <http://www.cdc.gov/growthcharts/data/set1clinical/cj411024.pdf>

Knowing your BMI helps determine whether you are consuming more or less calories than you burn. When your body uses the same number of calories that you take in, weight stays the same. Consuming fewer calories than the body uses results in weight loss, while consuming more calories than you burn causes weight gain.



McRel(www.mcrel.org)

Mathematics

Standard 3: Uses basic and advanced procedures while performing the processes of computation
Level III (Grades 6–8)

- Adds, subtracts, multiplies, and divides integers, and rational numbers
- Adds and subtracts fractions with unlike denominators; multiplies and divides fractions
- Understands exponentiation of rational numbers and root-extraction (e.g., squares and square roots, cubes and cube roots)
- Selects and uses appropriate computational methods (e.g., mental, paper and pencil, calculator, computer) for a given situation

Level IV (Grades 9–12)

- Uses recurrence relations (i.e., formulas expressing each term as a function of one or more of the previous terms, such as the Fibonacci sequence or the compound interest equation) to model and to solve real-world problems (e.g., home mortgages, annuities)



Nutritional Needs for Teens

Teens have special nutritional requirements. On the student handouts are the daily requirements for boys and girls between the ages of 12 and 18 for calories and five nutrients. The source for this information is the [*Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids \(Macronutrients\)*](#) from the Food and Nutrition Board, Institute of Medicine, National Academies. These nutrients are included because they are especially important for teens. Daily requirements for *all* vitamins and minerals can be found on this TeensHealth page:

http://kidshealth.org/teen/food_fitness/nutrition/vitamins_minerals.html. The

approximate calorie requirements are for children with sedentary or low activity levels. Active children require more calories (boys: 2400–3800, girls: 2100–2800).



McRel (www.mcrel.org)

Health

Level III (Grades 6–8)

Standard 2: Knows environmental and external factors that affect individual and community health

- Knows cultural beliefs, socioeconomic considerations, and other environmental factors within a community that influence the health of its members (e.g., relationship of values, socioeconomic status, and cultural experiences to the selection of health-care services)
- Understands how various messages from the media, peers, and other sources impact health practices (e.g., health fads, advertising, misconceptions about treatment and prevention options)

Level IV (Grades 9–12)

- Knows how the health of individuals can be influenced by the community (e.g., information offered through community organizations; volunteer work at hospitals, food banks, child care centers)
- Knows how individuals can improve or maintain community health (e.g., becoming active in environmental and economic issues that affect health, assisting in the development of public health policies and laws, exercising voting privileges)

Find the nutritional content of the foods by reading nutrition facts labels. Grocery stores may also have nutrition details for produce and other non-packaged items near these foods in the store. Many recipes include nutrition information. Nutrition data for restaurant meals and fast foods are often available online by visiting the restaurant’s Web page. See the resources section for guidance on finding calorie and nutrition information for different foods.

Active Teens Are Healthy Teens

Exercise should be a part of teens’ lives—a daily part. Teens should get at least 60 minutes of exercise every day, and for good reason. Of course exercise is good for the body and helps maintain a healthy weight and toned muscles. And exercise helps people stay healthier as they grow older. But it’s also good for well-being. Kids who exercise may sleep better. And exercising produces chemicals called endorphins that make a person feel relaxed and positive.

There are many ways to exercise. Aerobic exercise gets the heart pumping and the lungs breathing. It’s good for the heart and the whole body, bringing oxygen to every cell. Examples of aerobic exercise include dancing, swimming, biking, running, hiking, skating, and playing sports such as tennis or basketball. Strength training is any kind of workout that builds muscle. Having

muscle actually helps in weight control, as muscle burns more calories than fat when the body is at rest. Lifting weights is an obvious way to do this, but push-ups, squats, and sit-ups do the same. Aerobic exercises such as running and jumping also build muscle. And many strengthening exercises also get the



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heart pumping. Flexibility training helps keep muscles pliant so that they can stretch more easily. This is important to prevent injuries. Stretches such as side and leg bends and reaches are good ways to improve flexibility. Gymnastics, yoga, martial arts, and ballet all promote flexibility. It's ideal to include all three types of exercise in your routine.

Partnership for 21st Century Skills (<http://www.21stcenturyskills.org/>)

Critical Thinking and Problem Solving

- Effectively analyze and evaluate evidence, arguments, claims and beliefs
- Synthesize and make connections between information and arguments
- Interpret information and draw conclusions based on the best analysis
- Solve different kinds of non-familiar problems in both conventional and innovative ways
- Identify and ask significant questions that clarify various points of view and lead to better solutions

Communication and Collaboration

- Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts

Information Literacy

- Access information efficiently (time) and effectively (sources)
- Evaluate information critically and competently
- Use information accurately and creatively for the issue or problem at hand
- Manage the flow of information from a wide variety of sources

ICT (Information, Communications and Technology) Literacy

- Use technology as a tool to research, organize, evaluate and communicate information
- Use digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy



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Lesson Plan:

1. Introduce the topic of obesity and discuss why it's such a problem.
2. Define body mass index and go over the formula with the group. Because students may be reluctant to share their BMIs with others, ask them to calculate this figure at home. You may wish to send home an explanatory note with students encouraging everyone to calculate the figure. Be sure to include the formula on the note. Stress to students that the BMI is private, and they don't have to share it with anyone. There are online BMI calculators that students may use to check their calculations. One such calculator is at this Centers for Disease Control and Prevention page: <http://apps.nccd.cdc.gov/dnpabmi/>.
3. Explain that students will learn about nutrition and exercise basics and then **evaluate** their personal eating and exercise habits by recording what they eat and drink and how they exercise over the course of a week. Encourage students to work with and include their family members in the activity. Family members may even choose to join in and keep their own charts. When the whole family is involved, making healthy choices is easier. A note inviting families to participate could be included along with the take-home BMI information or sent separately.
4. Hand out copies of the two student handouts. For one week, students are to record everything they eat on the "Eats for a Week" chart. They will note food and drink quantities and estimate the calorie content of each meal. They will also keep track of the amount of calcium, fat, fiber, iron, and protein in their food. On the "Weekly Workout" chart they should write down the type and duration of exercise they do each day for the same week. They will calculate the amount of calories burned from their exercise.
5. At the end of the week, students are to **analyze** their food and exercise habits in terms of the amount of calories eaten and burned and the amount of the nutrients teens require. Have them total up the calories in (calories from food and drink) and calories out (calories burned through normal activity plus exercise) for each day. To figure the calories out, they should begin with the number of daily calories required for their activity level and add to that the number of calories burned through exercise. They should also total the amount of the five nutrients they eat each day and **compare** the totals to the daily requirements. They should **summarize** their findings by noting areas of deficiency and any overall patterns such as consuming more calories than they burn.
6. They can then conduct research into improving diet and exercise to better meet their needs. If students are already meeting minimum requirements, they can still look into ways of improving their diets and fitness to be even healthier. The Let's Move! Web site and other resources listed here provide ample material for this part of the lesson. Things they may want to consider include cutting back on screen time, adding more fresh fruits and vegetables to their diets, substituting water for sugary drinks, and reducing portion size. They may also examine the amount of sugar and sodium in their foods, as most Americans far exceed healthy levels of these two nutrients in their diets.
7. Students will use the information gleaned from their research to devise new meal and exercise plans. They should include all foods and drinks for breakfast, lunch, and dinner, as well as at least two healthy snacks. The daily total of calories in and calories out should be balanced, and their foods should meet daily requirements for the five nutrients tracked. Exercise plans should include at least 60 minutes of activity each day and balance aerobic, strengthening, and flexibility workouts. Again, encourage students to work with their families in devising their plans. Share the completed plans with the group.



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8. Students should do their best to try their new diet and exercise plans for at least a week and write journal entries to chronicle the experience. At the end of the week, discuss how students felt on the new regimen and any problems/surprises they encountered.

Assessment:

Evaluate students in terms of whether they kept accurate records of food intake and exercise, whether they conducted thorough and careful research, and whether they devised a healthy meal and exercise plan.

Extension:

Ask students to write an essay or journal entry that explores societal influences on food and lifestyle choices. Do students feel pressured to look a certain way? Do they feel pressured to eat certain foods because everyone else does? Have students who've tried eating differently met resistance from friends or family? Do they think the way celebrities or models look influences how kids want to look?

Resources:

Let's Move: <http://www.letsmove.gov/>

TeensHealth Nutrition and Fitness Center:

http://kidshealth.org/teen/food_fitness/exercise/nutrition_center.html

Helpguide.org's Nutrition for Children and Teens:

http://www.helpguide.org/life/healthy_eating_children_teens.htm#teens

American Dietetic Association: <http://www.eatright.org/default.aspx>. These pages in particular: Nutrition for Kids and Teens (<http://www.eatright.org/Public/content.aspx?id=5530>), Understand Body Mass Index (<http://www.eatright.org/Public/content.aspx?id=6844>), Ways to Shave Calories (<http://www.eatright.org/Public/content.aspx?id=6849>)

The President's Council on Physical Fitness and Sports: <http://www.fitness.gov/>. These two pages are especially relevant: Physical Activity Facts (<http://www.fitness.gov/resources/facts/index.html>) and 10 Tips (<http://www.fitness.gov/10tips.htm>)

USDA's *yourSELF* Middle School Education Kit for grades 7 and 8 contains student magazines, workbooks, teacher's guide, a video, and poster. The magazine, workbook, and guide can be downloaded for free at <http://teammnutrition.usda.gov/Educators/yourself.html>.

CDC's BMI Percentile Calculator for Child and Teen: <http://apps.nccd.cdc.gov/dnpabmi/>

Web MD's Fit-o-Meter (exercise calorie counter): <http://www.eatright.org/Public/content.aspx?id=6849>

Fast Food Calorie Chart from *The Washington Post*: http://www.washingtonpost.com/wp-srv/flash/health/caloriecounter/calories_static.html

USDA Nutrient Data Laboratory offers keyword searches to find nutritional information on just about any food at <http://www.nal.usda.gov/fnic/foodcomp/search/>. It also has an alphabetical calorie chart PDF at <http://ssmhealth.adam.com/graphics/pdf/en/19996.pdf>.

Activity Designer: *Rhonda Lucas Donald is a freelance writer and educational consultant.*



Handout
Eats for a Week

Record the foods and drinks you consume for each meal and the total amount of calories and five nutrients as shown for each day. To learn the amount of calories or nutrients, you'll need to know about how much of each food or drink you consumed. Use Nutrition Facts labels on foods along with other sources to find calorie and nutrient content.

	Boys	Girls
Calories	1800–2800*	1600–2000*
Calcium	1300 mg	1300 mg
Fat	25–35%**	25–35%**
Fiber	38 g	26 g
Iron	11 mg	15 mg
Protein	52 g	46 g

* Approximate calorie requirements are for children with sedentary or low activity levels. Active children require more calories (boys: 2400–3800, girls: 2100–2800).
 ** Fat requirements are a percentage of the total calories eaten per day. In other words, calories from fat shouldn't exceed 25–35% of calories consumed.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Breakfast							
Lunch							
Dinner							
Snacks							
Total Calories							
Total Calcium							
Total Fat							
Total Fiber							
Total Iron							
Total Protein							



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**Handout
Weekly Workout**

Record all exercise or physical activity for each day and how long you exercised. Use online or other resources to calculate the number of calories burned by the exercise for each day.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Exercise or Activity							
How long did you exercise?							
Total Calories Burned							