

FAST FOOD: YOU CAN CHOOSE!

GRADES 9-12

JODALE ALES

TIME ALLOTMENT:

Approximately three 50-minute classes. If students are unfamiliar with the decision-making based on science method you will want to spend at least one class period helping them learn the method.

OVERVIEW:

Students will work in groups to research the nutritional value of items on fast food menus. They will use science content knowledge to compare these nutritional values and organizing and graphing skills to visualize them. Science processing skills will be used to make decisions about which foods are better for their health. Students will communicate these decisions to others.

SUBJECT MATTER:

Integrated or General Science, Life Science, Biology, Health and Physical Education, Environmental Science

LEARNING OBJECTIVES:

Students will be able to:

- Research Internet resources and gather data and other information.
- Credit sources of information.
- Organize data and other information into tables and graphs or charts.
- Describe the relationship between hazards, risk, and risk assessment
- Describe the components of healthy nutrition.
- Connect human, political, environmental, cultural, economic, nutritional, and behavioral impacts on foods and on people's food choices.
- Use decision-making skills based on science to choose the best option.
- Communicate their findings and decisions to others.



STANDARDS:

National Science Education Standards

<http://bob.nap.edu/html/nses/>

Unifying Concepts and Processes

- Systems, order, and organization
- Evidence, model, and explanation
- Constancy, change, and measurement

Science as Inquiry

- Abilities necessary to do scientific inquiry

Life Science

- (5-8) Structure and function in living systems
- (5-8) Regulation and behavior
- (5-8) Populations and ecosystems
- (9-12) Interdependence of organisms
- (9-12) Matter, energy, and organization in living systems

Science in Personal and Social Perspectives

- (5-8) Personal health
- (5-8) Natural hazards
- (5-8) Risks and benefits
- (9-12) Personal and community health
- (9-12) Natural and human-induced hazards

Excellence in Environmental Education Guidelines

http://www.naaee.org/npeee/learner_guidelines.php

Strand 1: Questioning and Analysis Skills

- Guidelines: A) Questioning
C) Collecting information
E) Organizing information

Strand 2: Knowledge of Environmental Processes and Systems

2.2: The Living Environment

- Guideline: C) Systems and connections
D) Flow of matter and energy

2.4: Environment and Society

- Guideline: A) Human/environment interactions

Strand 3: Skills for Understanding and Addressing Environmental Issues

3.2: Decision-Making and Citizenship Skills

- Guideline: A) Forming and evaluating personal views
C) Planning and taking action

Strand 4: Personal and Civic Responsibility

- Guideline: D) Accepting personal responsibility



GE Fund



Louisiana Science Frameworks:

State Standards for Curriculum Development

<http://www.doe.state.la.us/doe/assessment/standards/SCIENCE.pdf>

SE-M-A4: Understanding that human actions can create risks and consequences in the environment

SE-M-A5: Tracing the flow of energy through an ecosystem and demonstrating a knowledge of the roles of producers, consumers, and decomposers in the ecosystem

SI-M-A1: Identifying questions that can be used to design a scientific investigation

SI-M-A3: Using mathematics and appropriate tools and techniques to gather, analyze, and interpret data

SI-M-A4: Developing descriptions, explanations, and graphs using data

SI-M-A5: Developing models and predictions using the relationships between data and explanations

SI-M-A7: Communicating scientific procedures, information, and explanations

SI-M-B1: Recognizing that different kinds of questions guide different kinds of scientific investigations

LS-M-A6: Describing how the human body changes with age and listing factors that affect the length and quality of life

LS-M-C2: Modeling and interpreting food chains and food webs

SE-H-A2: Investigating the flow of energy in ecological systems

SI-H-A1: Identifying questions and concepts that guide scientific investigations

SI-H-A3: Using technology and mathematics to improve investigations and communications

SI-H-A4: Formulating and revising scientific explanations and models using logic and evidence

SI-H-A6: Communicating and defending a scientific argument

LS-H-D2: Describing trophic levels and energy flows

LS-H-G1: Relating fitness and health to longevity

MEDIA COMPONENT:**Video:**

Enviro-Tacklebox™, *Your Burger and the World* (19:36 minutes)

Louisiana Public Broadcasting, **Enviro-Tacklebox™** program, Louisiana Education Television Authority. 2000.

Web site:

Enviro-Tacklebox™ resource materials for **Your Burger and the World** can be found at <http://www.envirotacklebox.org/>. This excellent site provides a teacher guide, streaming video, student guide, and other resources for **Your Burger and the World, Module 2** of the **Enviro-Tacklebox™** program. RealOne Player is used to view the video and can be downloaded from the Web site.

Nutritional information on fast food choices can be found at each individual company's Web site including McDonalds – <http://www.mcdonalds.com>, Taco Bell – <http://www.tacobell.com/nutritionguide/>, Burger King – <http://burgerking.com/food/nutrition/>, and Subway – <http://www.subway.com>.

An excellent site that will search related fast food choices is <http://www olen.com/food>. Students can fill in different criteria such as hamburgers with less than 300 calories and all restaurants meeting the criteria will pop up. Students may also select specific restaurants. They can leave the criteria blank and get all information on a particular food.

Excellent sites for basic nutritional information include the USDA Food and Nutrition Information Center at <http://www.nal.usda.gov/fnic/>. The US Department of Health and Human Services Healthfinder at <http://www.healthfinder.gov/> links to a multitude of agencies and organizations that provide consumer health information. These sources are reliable and thorough.

If you are interested in including information about food additives, the Center for Science in the Public Interest at <http://www.cspinet.org/> has excellent information.

MATERIALS:*Per Student:*

- Basic materials for taking notes and writing
- **Your Burger and the World Student Viewing Guide**
- **Decision Chart and Importance Bars Work Sheet**
- **USDA Food Pyramid Guide**

Per Teacher:

- **Your Burger and the World Student Viewing Guide Answers** (attached)

PREP FOR TEACHERS:

1. Prior to teaching the unit, bookmark the Web sites students will use as references and if possible put links to them from your school website or provide links on your course management site, for example Blackboard, if you have access to one.
2. Download the RealOne Player needed for viewing the video online from the **Enviro-Tacklebox™** Web site.
3. Review the **Module 2 Enviro-Tacklebox™** web resources and the video related to **Your Burger and the World**.
4. Review the introduction to **Decisions Based on Science** in **Module 2** on the **Enviro-Tacklebox™** web site.
5. Gather interest-grabbing news about fast foods. The **Wall Street Journal** is one good source. Examples that can stir student interest are the number of fast food hamburgers eaten each year or the annual earnings of fast food businesses. It was once proposed that overweight people might sue McDonalds because of their weight gain.
6. Prepare copies of student handouts or post them electronically.

INTRODUCTORY ACTIVITY:

1. One week before the lesson take a class survey of fast food eating habits and record the student responses on an overhead or the blackboard for students to see. Begin by asking how many students eat at fast food restaurants. Students can help generate other questions such as "How many times a week do you eat at a fast food restaurant?", "What is your favorite fast food?", "What is your favorite fast food restaurant?", and "What are some of the reasons why you eat at fast food restaurants?"
2. Responses can be quantified and then converted into bar graphs for visualization.
3. Ask students to keep a "fast food" journal by recording the fast foods they eat for a week.
4. The day of the lesson ask the students to share their reflections from their "fast food" journals.
5. Share any interest grabbing news you have found about fast foods.
6. Lead into the lesson by asking students if fast foods are good or bad for them.

LEARNING ACTIVITIES:

1. Decision-Making
If your students are unfamiliar with the Decision Matrix and Importance Bars used in **Decisions Based on Science** introduce them to this process by having the students practice decision-making in groups. Then have the groups report to the class. If your students have experience with the decision-making method, begin at step 2.
2. Video Viewing
Introduce the diet and nutrition concepts by showing the **Enviro-Tacklebox™** video **Your Burger and the World**.
 - A. Ask students if they have ever thought about where a hamburger comes from or how it impacts the world. Hand out the **video viewing guide**.
 - B. **PLAY** the video. During each clip students will record their responses to questions on the **video viewing guide**. Lead a class discussion after each clip.

Video Clip 1 – This clip runs from the beginning until a pause after the Womack family farmers talk about the number of cows an acre of pasture will support. It begins with Greg at the Bait Shop getting ready for a barbecue. He introduces the idea of a worldview of a burger and mentions calories, carbohydrates, sugar, and fat. Greg then talks about how early Native Americans ate grains and fish (hunter-gatherers). As America changed so did our means of getting food. Farms developed where crops were grown and this changed our environment. These changes represent an **environmental impact** of foods as illustrated by the burger. We are introduced to a family of cattle farmers who talk about the work they do to raise beef cattle. After the clip, lead the discussion making sure to include the terms; calories, carbohydrates, sugar, and fat.

Ask the students to talk about ways the environment has changed (environmental impact) as our ways of obtaining food have changed.

Video Clip 2 – The clip begins with an illustration of energy flow through a food chain (Grass [producer]→steer [first level consumer]→people [second level consumer]). It reports that the amount of grain needed to feed one steer can feed many more people if they choose to eat lower on the food chain. It also discusses **cultural impacts** of foods worldwide. The **political impact** of food distribution and food shortages, **environmental impact** of cattle wastes getting into water supplies, and the **economic impact** of marketing foods are mentioned. The clip ends with **behavioral impacts** and **nutritional impacts**. Pause the video and ask the students to make a list of the impacts discussed and give examples of each.

Video Clip 3 – Greg begins by making the impacts of food relevant to the students. Students begin to take ownership of this concept when he asks, “Does your family consider these impacts when buying food?” Favorite foods taste good. Greg takes a trip to Pennington Biomedical Research Center and observes research in the chemical senses lab. Scientists are studying how fats make foods taste good. Next, cookbook writer Holly Clegg and her daughters make a health conscious dish that is both nutritious and tastes good. LSU researchers are raising cattle that produce a leaner beef. You can read the nutrition label on foods to help you decide what foods to eat and study the food pyramid guide. Greg stresses that you can make your own decisions about foods based on what you know about their impacts. Stop here for a class discussion of what factors people consider when deciding (choosing) what to eat. Reemphasize the list of food impacts and their examples.

CULMINATING ACTIVITIES:

1. Review the decision-making process with the class and relate it to making a decision about what food to eat at a fast food restaurant.
2. Risk Analysis. Ask the students to think of ways that fast foods can be a hazard. Have the class generate a list of risks and benefits related to food choices at fast food restaurants both now and in the future (accumulated effects). Following the discussion ask each student to predict which fast food is the best to eat and which is the worst to eat and record their responses in their journals. Next ask “Who gets to choose which fast foods you will eat?”
3. Decision-Making Based on Science. Prior to the actual research ask the class to generate a list of **goals** from their risk assessment and a list of **options** (actions). The students should also estimate the possible outcomes or consequences of each option.
Assign groups of students to use the Internet to research the nutritional value of food items listed on three selected fast food restaurant menus. The class can choose which foods to research and each group should research the same foods. You may opt to ask them to research the same restaurants or let each group select its choices.
Have each group organize the data they have collected into a table and construct bar graphs using Microsoft Excel or other graphing software that compares the number of calories and calories from fat for each food item and each restaurant. Have each group complete the decision matrix and draw importance bars to choose the foods that best fit the goals and options.
4. Each group should present its findings and decisions to the class for discussion.

CROSS-CURRICULAR EXTENSIONS:**FINE ARTS / SCIENCE:**

- Students create labeled drawings of a food chain or food web illustrating their choices. Discussion should focus on energy flow and whether the foods are high or low on the food chain.

SOCIAL STUDIES:

- Students research foods from other cultures and/or present information on their own ethnic foods.

COMMUNITY CONNECTIONS:

- Invite a nutritionist or dietician to speak to the class about food values and health consequences.
- Invite a representative from a fast food restaurant to speak to the class about how their company addresses nutritional needs.
- Have the student groups write letters to the individual restaurants reporting their findings.

STUDENT MATERIALS:

- **Your Burger and the World Student Viewing Guide**
- **Decision Chart and Importance Bars Work Sheet**
- **USDA Food Pyramid Guide**

STUDENT HANDOUT FOR DECISIONS BASED ON SCIENCE

DECISION MATRIX			
	Option 1:	Option 2:	Option 3:
Goal A:			
Goal B:			
Goal C:			

IMPORTANCE BARS

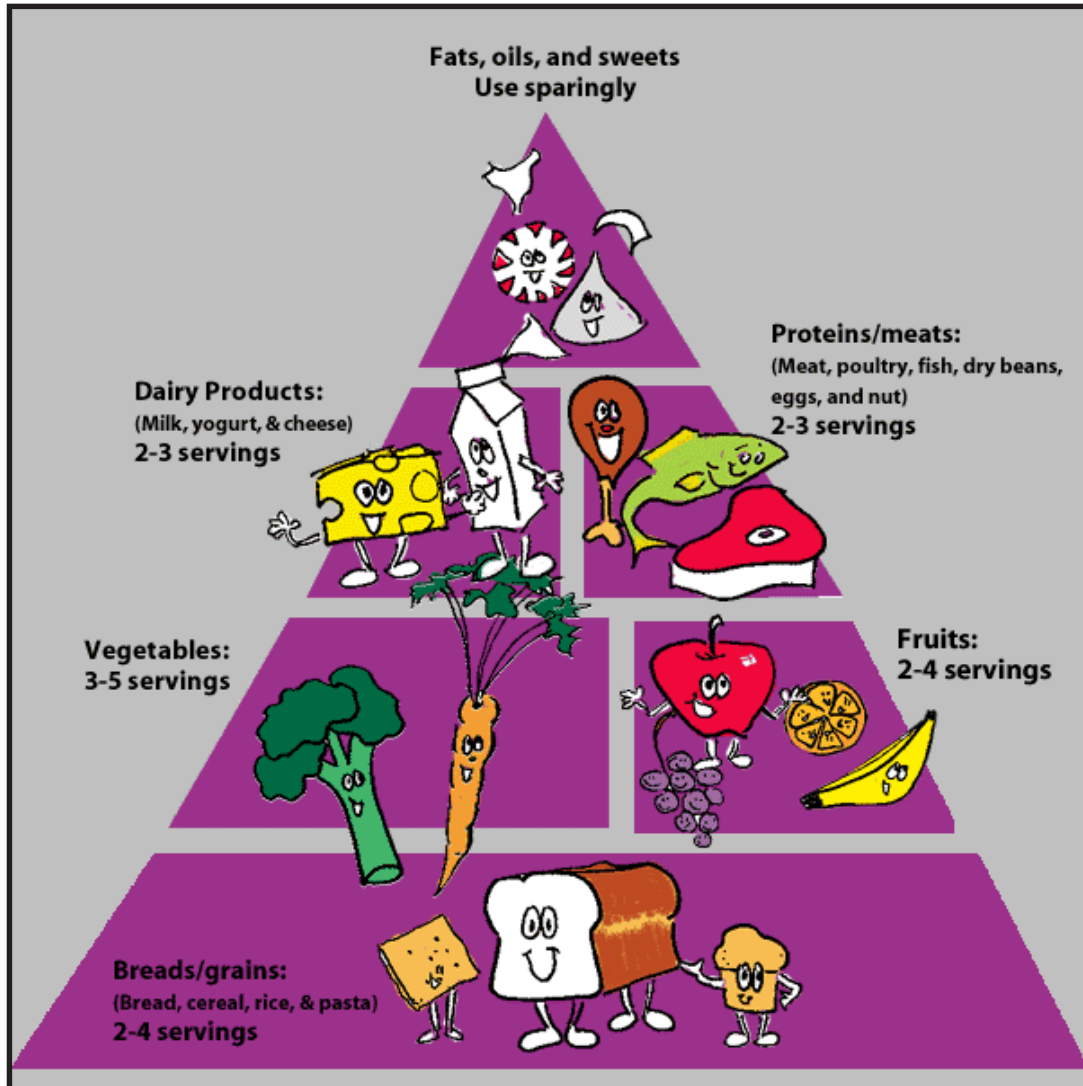
Goal A: _____

Goal B: _____

Goal C: _____

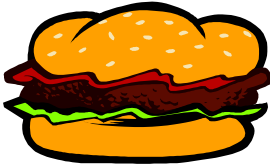
Source: From DECISIONS BASED ON SCIENCE by Vincent Campbell, Jocelyn Lofstrom, Brian Jerome, copyright©1997 by the National Science Teachers Association.Used by permission.

USDA Food Pyramid Guide:



Source: ENVIRO-TACKLEBOX™ TEACHER'S GUIDE MODULE 2: YOUR BURGER AND THE WORLD by Louisiana Public Broadcasting, copyright © 2000. Used with permission.

NAME _____ CLASS _____ DATE _____

**YOUR BURGER AND THE WORLD
STUDENT VIEWING GUIDE****Clip 1:**

1. What are calories used to measure in foods?

2. Carbohydrates, sugars, and fats are different types of compounds found in foods.

Describe the relationship between carbohydrates and sugars.

What are the functions of carbohydrates and fats in the body?

3. What are some environmental impacts caused by farming and raising cattle?

Clip 2:

4. Draw a diagram of the food chain shown in the video and label the producer, the first level consumer, and the secondary consumer and describe how they are related to each other.



5. A) What does it mean to eat “lower on the food chain”? B) How would this change the environmental impact of food production? C) How would it affect your health?

6. List the 6 factors that impact foods and give an example of each.

Clip 3:

7. What impacts does your family consider when buying food?

**YOUR BURGER AND THE WORLD
STUDENT VIEWING GUIDE
ANSWER KEY**

1. Calories are units of measurement that measure the amount of heat energy in foods.
2. Carbohydrates, sugars, and fats are organic compounds found in foods that provide energy. Carbohydrates are a major group that contains compounds of carbon, hydrogen, and oxygen that provide quick energy. Sugars are examples of carbohydrates and are the smallest carbohydrate molecules. They can be quickly broken down to release energy. Fats are larger molecules that contain carbon, hydrogen, oxygen, and sometimes phosphorous, or nitrogen. They are stored in the body and can be broken down to release energy but more slowly than carbohydrates.
3. During farming pesticides and fertilizers are often added. These chemical compounds release nitrogen and phosphorous compounds that can runoff the soil surface into bodies of water. When the amount of these chemicals reaches a certain concentration they can be harmful to living things. Overuse of the soil can result in erosion and land loss. Farming often uses irrigation to provide enough water for crops. This can deplete water used for other things such as drinking water. Cattle can overgraze an area resulting in erosion and loss of topsoil. They also produce waste that washes into lakes and other bodies of water. This can also be harmful for living things.
4. Grass (producer) → cattle (first level consumer) → humans (second level consumer)
Producers convert the energy of sunlight into organic molecules, mainly sugars, that living things use for energy and building blocks. Consumers must eat other living things in order to obtain these organic molecules.
5. A) When humans eat lower on the food chain they eat more fruits and vegetables.
B) The amount of grain to feed one steer will feed many more people. This is a more efficient use of land and is less disruptive to the environment.
C) Fruits and vegetables (producers) are better for you than meats (consumers). They are lower in fats and higher in fiber and contain many dietary supplements such as vitamins that contribute to better health.
6. Examples will vary.
Environmental Impact – pollution from chemicals used in farming
Cultural Impact – Asian cultures eat more rice and less red meat
Political Impact – food shortages can cause political unrest
Economic Impact – growing, harvesting, processing, and marketing foods contributes to the economy and provides jobs
Behavioral Impacts – people eat fast foods because they don't have enough time to shop and cook
Nutritional Impacts – Calcium is needed to reduce osteoporosis of the loss of bone density
7. Answers vary.
Cost and time are two factors.