Module 6 • The FUNdamentals of Food!

Brief Overview

This module provides an introduction to the Food, Nutrition, and Agriculture unit. Students review what they know about ecosystems. They will learn about how their bodies behave like ecosystems and talk about inputs and outputs. Students will also investigate the components of food and how they support the body and its functions. Students will identify daily activities that promote an active lifestyle, while recognizing activities that do not. Finally, students will plant a garden, choosing nutritionally diverse foods based on color and vitamin contents.

Module Contents

Time

15 – 16 sessions

Desired Outcomes

Students will:

- Identify inputs and outputs of an ecosystem.
- Identify foods as inputs for humans such as carbohydrates, proteins, fats, vitamins, and minerals.
- Identify and read key components of a Nutrition Facts label.
- Identify benefits of exercise for the body.
- Explain benefits of gardening in the community.
- Demonstrate proper planting techniques in a garden.

What You'll Need

Materials

- Journals
- Pencils
- Crayons/Markers
- Ecosystem Poster: see directions in Lesson Preparation
- Clipboards
- Poster board or chart paper
- Butcher paper
- A simple balance scale (see option below if scale is unavailable)
- 9 plastic bags (sandwich-size) of rice or beans (pre-measured and labeled)
- Grocery inserts (can be collected from local grocery stores at front of store) OR Food magazines
- Scissors
- Glue sticks
- Snack foods
  - raisins
  - fruit snack
  - pretzels
  - potato chips
  - Gatorade or bottled water (or box juice)
- Samples of food labels on food packages (ex: a bag of chips, box of pretzels, soft drink can)
- **Book** for Enrichment: "I'm Walking, I'm Running, I'm Jumping, I'm Hopping," by Richard Harris (if available)
- **Book:** Takiya and Thunderheart's Life Garden (Hardcover) by J. Victor McGuire (Author), Gershom Griffith (Illustrator)
- Disposable Camera (for documenting visit to the community garden)
- Graph Paper
- Community Garden pictures

For Garden:

(Note: the Parks and People Foundation Gardner will provide all supplies necessary for this activity)

- Purchased seedlings
- Garden plan (created last lesson)
- Plant Identification Markers (Stakes with crop name)
- Laundry pen
- Trowels (enough for children to comfortably share)
- Powdered organic fertilizer
- Empty milk jugs (# depends on how you organize children for planting)
- Eco-spouts (# depends on number of jugs)
- Chicken wire or other fencing material (per recommendation of gardener)
- Mulch (per recommendation of gardener)

□ Garden Maintenance Checklist
□ Optional: Students can use paints and wood pieces to create a sign and labels for their garden

Worksheets and Handouts

□ *Schoolyard Ecosystem Worksheet*
□ *Ecosystem Definition Handout*
□ *Food Label Investigation Sheets*
□ *Food Label Comparison Sheets*
□ *Go, Slow, and Whoa!*
□ *Go, Slow, and Whoa Scavenger Hunt sheets*
□ *Get Up and Exercise! Handout*
□ *Handout: Planting Guidelines for Cool Weather Crops (may need to omit)*

Journals

□ Lesson 3: "What is a Food Chain?"
□ Lesson 5: "Is Your Body an Ecosystem?"
□ Lesson 6: "What are Nutrients?"
□ Lesson 7: "Keeping a Food Diary"
□ Lesson 8: "What do you do to exercise?"
□ Lesson 9 – A: "Takiya and Thunderheart's Life Garden" reflection
□ Lesson 9 – B: A Community Garden

Picture Slides

□ Lesson 3: Food Chain ID cards
□ Lesson 5: Nutrient Slides
□ Lesson 7: "Red Light, Green Light" Game Slides

People Power

Prior to Lesson 9, call the Parks & People Foundation (410-448-5663) for contact information for local community gardens and gardeners. A master gardener will be a helpful volunteer for gardening activities.

Try to get help from gardeners from Parks and People Foundation or Master Gardeners, 4-H staff, graduate students from the Morgan State University Department of Landscape Architecture, etc.

New Vocabulary

Abiotic
(Review) Non-living.

Added fats or sauces
Vegetables prepared with added fats or sauces, such as butter or cream. .

Biotic
(Review) Living.

Carbohydrates
Mainly sugars and starches, that serve together as one of the three principal types of nutrients used as energy sources (calories) by the body.

Consumer
Animals that obtain nutrition by eating other living things. A primary consumer eats plants and is considered an herbivore. Secondary consumers and those that follow are either omnivores (plant and meat eating) or carnivores (meat eating only).

Decomposer
Organisms that break down the remains of living things in order to recycle nutrients back into the ecosystem.

Dehydration
A state of unbalance in your body that occurs when the fluids going in (input) is LESS than the wastes going out (output).

Ecology
(Review) The study of how living things interact with each other and their physical environment.

Ecosystem
(Review) An area where living things interact with each other and their physical environment.

Exercise
Bodily or mental activity especially for the sake of improving health.

Extra-lean and lean beef
Ground beef that has the least amount of fat. Lean ground beef has a little more fat than extra-lean, but less fat than regular ground beef.

Fats
One of the three nutrients used by the body as energy. The other nutrients are carbohydrates and proteins.

Flexibility
Capable of being bent without breaking.

Food Chain
The sequence of who eats whom in a biological community (an ecosystem) to obtain nutrition.

Harvest
To gather a crop when it has grown enough to be eaten.

Homeostasis
A state of balance in your body. Homeostasis occurs when there is a balance of input (food and fluids) going to our body and output (sweat and wastes) leaving our body.

Ingredients
The parts of any mixture or combination.

Input
The materials that enter an ecosystem. Sunlight, water, and gases (carbon dioxide) are inputs in an ecosystem as they supply the resources needed for the process of photosynthesis.

Label
A written or printed article used to provide information about something.

Layout
The plan, design or arrangement of something like a garden

Light syrup and heavy syrup
canned or packaged fruits are packed in syrup.

Maintenance
The care and upkeep of something such as a garden.

Minerals
Elements found in different foods that support the body's health, growth, and function.

Nutrient
Any substance that provides nutrition to a living thing (i.e. carbohydrates, fats, minerals, proteins, vitamins).

Organism
Any cellular living thing whose different components work together as a whole to carry out life processes.

Output
The materials that leave an ecosystem. Food and nutrients are outputs in an ecosystem.

Producer
Organisms that make their own food from sunlight (and/or chemical energy from deep sea vents) and are the base of every food chain.

Proteins
Complex molecules found in certain foods (such as meats, fish, and nuts) that develop, maintain, and replace tissues in your body.

Scaled Drawing
A drawing that represents a real object but uses a scale. The scale of the drawing is the ratio of the size of the drawing to the actual size of the object. For example, 1 inch on the drawing may represent 1 yard in the garden plot.

Vitamins
Substances that are found in different foods that support the body's health, growth, and function.

Trans fats
Hydrogenated oils used in crackers and snack foods and has been found to be unhealthy for your heart. Some products are now advertising that they have 0 trans fats.

Types of milk
Milk comes in more varieties than just white and chocolate! Skim milk and 1% mild have the least fat, while 2% milk has a little more fat than the lowfat milks. Whole milk has the most fat.

Whole grains
Whole grains contain more fiber and nutrients than white flour, which is used to make white bread, pasta, and lots of other stuff.

Careers

Students will learn about different occupations in ecology-related fields

- Nutritionist
- Horticulturist

Preparing for the Lessons

Leaders will:

- REVIEW ALL NEEDED MATERIALS IN ADVANCE TO PLANNING THE LESSON!
- Review the lesson sequences and the lesson preparation directions.
- Review the "Background for Teachers" and useful websites prior to facilitating the lessons.
- Prepare areas in the classroom and hallways for hanging student work.
- Clean/remove "unsafe objects from outdoor areas where students will investigate.

- Identify potential parent or school adult volunteers.
- Identify possibilities for a culminating activity and arrange for any field trips or classroom visitors.

Module 6 • Lesson 1 • What is an Ecosystem?

Background for Teachers:

(adapted from http://www.globalchange.umich.edu/globalchange1/current/lectures/kling/ecosystem/ecosystem.html)

What is an Ecosystem?

An ecosystem is an area where living things interact with each other and their physical environment. There are many examples of ecosystems -- a pond, a forest, an estuary, a grassland. The boundaries are not fixed in any objective way, although sometimes they seem obvious, as with the shoreline of a small pond. Usually the boundaries of an ecosystem are chosen for practical reasons having to do with the goals of the particular ecological study.

The study of ecosystems mainly consists of the study of certain processes that link the living, or biotic, components to the non-living, or abiotic, components. Energy transformations and biogeochemical cycling are the main processes that comprise the field of ecosystem ecology. ***Ecology*** *is generally defined as the interactions of organisms with one another and with the environment in which they occur. We can study ecology at the level of the individual, the population, the community, and the ecosystem.*

Processes of Ecosystems

This figure with the plants, zebra, lion, and so forth illustrates the two main ideas about how ecosystems function: ***ecosystems have energy flows*** *and* ***ecosystems cycle materials****. These two processes are linked, but they are not quite the same (see Figure 1).*

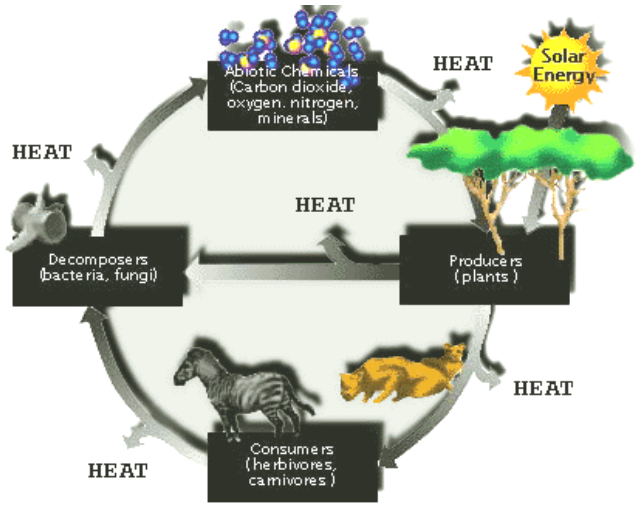


Figure 1. Energy flows and material cycles.

Energy enters the biological system as light energy, is transformed into chemical energy in organic molecules through photosynthesis and respiration, and ultimately is converted to heat energy. This energy is dissipated, meaning it is lost to the system as heat; once it is lost it cannot

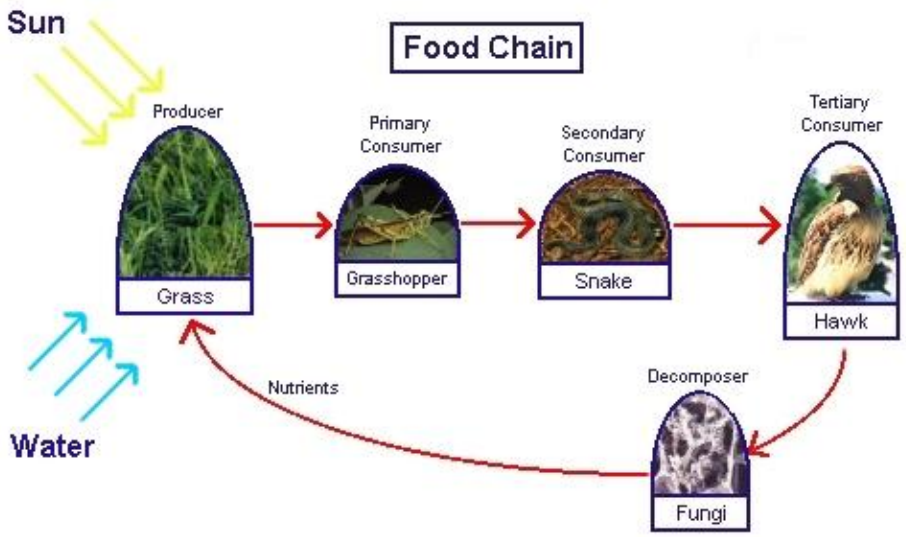
be recycled. Without the continued input of solar energy, biological systems would quickly shut down. Thus the earth is an open system with respect to energy.

Elements such as carbon, nitrogen, or phosphorus enter living organisms in a variety of ways. Plants obtain elements from the surrounding atmosphere, water, or soils. Animals may also obtain elements directly from the physical environment, but usually they obtain these mainly by consuming other organisms. These materials are transformed biochemically within the bodies of organisms, but sooner or later, due to excretion or decomposition, they are returned to an inorganic state. Often bacteria complete this process, through the process called decomposition.

During decomposition these materials are not destroyed or lost, so the earth is a closed system. The elements are cycled endlessly between their biotic and abiotic states within ecosystems. Those elements whose supply tends to limit biological activity are called ***nutrients****.*

Inputs and Outputs

Look at the simple food chain below:



http://www.jenningsk12.net/WE/peimann/Science/FoodChains/food_chain.jpe

The transformations of energy in an ecosystem begin first with the input of energy from the sun. Energy from the sun is captured by the process of photosynthesis in plants. Carbon dioxide is combined with hydrogen to produce carbohydrates (i.e. food). As a result, sunlight, water, and gases are inputs while food and nutrients are outputs..

Useful websites:
Baltimore Ecosystem Study:
http://www.beslter.org/frame2-page_1.html

A Kid-Friendly Explanation of Ecosystems:
http://forest.mtu.edu/kidscorner/ecosystems/definition.html

Action Synopsis

Students express their ideas about ecosystems. They explore the schoolyard for examples of ecosystems, identifying inputs and outputs.

Time

1 session

Desired Outcomes

Students will:

- Understand what an ecosystem is.
- Identify ecosystems on the schoolyard.
- Identify at least **2 inputs** and **2 outputs** of one schoolyard ecosystem.

What You'll Need

□ Ecosystem Poster: see directions in Lesson Preparation
□ Schoolyard Ecosystems Poster: see directions below
□ Schoolyard Ecosystem Worksheet
□ Ecosystem Definition Handout
□ Clipboards (one per student)

For Each Student

□ Poster board or chart paper
□ Clipboard (Pairs of students can share if necessary)

Preparing for the Lesson

Leaders will:

- Make the Ecosystem Poster: In the middle of a large piece of chart paper or poster board, write ECOSYSTEM in big, bold letters. Leave room to write student ideas around the word.
- Hang the Ecosystem Poster in an easily accessible area.
- Make the Schoolyard Ecosystem Poster: Across the top of a large piece of chart paper or poster board, write Schoolyard Ecosystems in big letters. Leave plenty of space to create a list below the title.
- Hang the Schoolyard Ecosystem Poster in an easily accessible area.
- Copy the Schoolyard Ecosystem Worksheet for each student.
- Copy the Ecosystem Definition Worksheet for each student.

New Vocabulary

Abiotic
(Review) Non-living.

Biotic
(Review) Living.

Ecology
(Review) The study of how living things interact with each other and their physical environment.

Ecosystem
(Review) An area where living things interact with each other and their physical environment.

Input
The materials that enter an ecosystem. Sunlight, water, and gases (carbon dioxide) are inputs in an ecosystem as they supply the resources needed for the process of photosynthesis.

Output
The materials that leave an ecosystem. Food and nutrients are outputs in an ecosystem.

Assessments

- Student responses for the Ecosystem Poster
- Student responses on the Schoolyard Ecosystem Worksheet
- Student responses for the Schoolyard Ecosystem Poster

Lesson Sequence

1. Draw students' attention to the ecosystem poster. Say the word and have students say the word. Ask students where they have seen or heard this word before.

2. After several students have recalled their experiences with the word ecosystem, have them give you some words or ideas that represent what they think an ecosystem is.

3. Write their ideas or words around the poster to create a poster with the students' big ideas about ecosystems.

4. Guide students to think of ecosystems that they are familiar with. As much as possible, have them think of local ecosystems that they may be able to find in their neighborhood. Using the examples that students provide, talk a little bit about the inputs and outputs to each.
   - Some examples include: A tree, pond, playground, the reading circle, gardens, a lawn, etc.
   - While we haven't introduced those concepts yet, their responses can serve as a pre-assessment and will provide students with some background information about inputs and outputs before they are formally introduced.

5. Take out the What is an Ecosystem? Handout and read it aloud with the students, stopping as necessary to take questions and comments. (Use the teacher background information on ecosystems as a guide for explaining the concepts to the students.)

6. Ask students if there is anything else they would like to add to their Ecosystem Poster.

7. Pass out the Schoolyard Ecosystems Worksheet and the clipboards. Take students outside to complete the worksheet.

8. Once outside go around the entire schoolyard looking for evidence of ecosystems. While on the schoolyard tour, be sure to point out different ecosystems, and explain the inputs and outputs of each. Give students clear examples of schoolyard ecosystems and how they work. Continually reinforce the idea of ecosystems having inputs and outputs, since that is what students should focus on for the worksheet.
   - For example, a tree can be an ecosystem. Some of the inputs to the ecosystem can include: sunlight, carbon dioxide, nutrients from the soil, water, etc. Some of the outputs can include: oxygen, water (from transpiration), food, shelter, etc.

9. After you have gone throughout the schoolyard with the students, have them explore on their own and fill out the worksheet.

- You may work with the students to fill out the worksheet, have them work alone or have them work in small groups to complete the questions.

10. Once most groups have finished their work, take the class back inside and collect the worksheets (for assessment) and the clipboards.

11. Draw students' attention to the Schoolyard Ecosystem Poster and have them recall some of the ecosystems they observed outside. Make a list of the ecosystems that students can recall from the schoolyard and 1 input and 1 output of each.

Maryland SC Standards (2nd and 3rd Grade): *Standards are presented in the following format:* *(Grade)Standard.Topic.Indicator.Objective – Objective Statement*	
Science	
Standard 1.0 Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.	**Constructing Knowledge** (2)(3)1.A.1.b – Seek information through reading, observation, exploration, and investigations. **Applying Evidence and Reasoning** (2)(3)1.B.1.b – Develop reasonable explanations for observations made, investigations completed, and information gained by sharing ideas and listening to others' ideas. **Communicating Scientific Information** (2)(3)1.C.1.a – Describe things as accurately as possible and compare observations with those of others. (2)(3)1.C.1.c – Draw pictures that correctly portray at least some features of the thing being described and sequence events (seasons, seed growth).
Standard 3.0 Life Science: Students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.	**Ecology** (2)3.F.1.b – Explain that organisms live in habitats that supply their basic needs. • Food • Water • Air • Shelter

Module 6 • Lesson 2 • You in the Food Chain!

Background for Teachers:

(From http://www.enchantedlearning.com/subjects/foodchain/)

Food chains demonstrate the connections among organisms in an ecosystem. Every organism needs to obtain energy in order to live. For example, plants get energy from the sun, some animals eat plants, and some animals eat other animals.

*A food chain is the sequence of who eats whom in a biological community (an ecosystem) to obtain nutrition. A food chain starts with the primary energy source, usually the sun or boiling-hot deep sea vents. The next link in the chain is an organism that makes its own food from the primary energy source -- an example is photosynthetic plants that make their own food from sunlight (using a process called **photosynthesis**) and chemosynthetic bacteria that make their food energy from chemicals in hydrothermal vents. These are called **primary producers**.*

*Next come organisms that eat the producers; these organisms are called **herbivores** or **primary consumers** -- an example is a rabbit that eats grass.*

*The next link in the chain is animals that eat herbivores - these are called **secondary consumers** -- an example is a snake that eats rabbits.*

In turn, these animals are eaten by larger predators -- an example is an owl that eats snakes.

*The tertiary consumers are eaten by **quaternary consumers** -- an example is a hawk that eats owls. Each food chain end with a **top predator**, and animal with no natural enemies (like an alligator, hawk, or polar bear).*

*The arrows in a food chain show the flow of **energy**, from the sun to a top predator. As the energy flows from organism to organism, energy is lost at each step. A network of many **food chains** is called a **food web**.*

*When any organism dies, it is eventually eaten by **detritivores** (like vultures, worms and crabs) and broken down by **decomposers** (mostly bacteria and fungi), and the exchange of energy continues.*

Some organisms' position in the food chain can vary as their diet differs. For example, when a bear eats berries, the bear is functioning as a primary consumer. When a bear eats a plant-eating rodent, the bear is functioning as a secondary consumer. When the bear eats salmon, the bear is functioning as a tertiary consumer (this is because salmon is a secondary consumer, since salmon eat herring that eat zooplankton that eat phytoplankton, that make their own energy from sunlight). Think about how people's place in the food chain varies - often within a single meal.

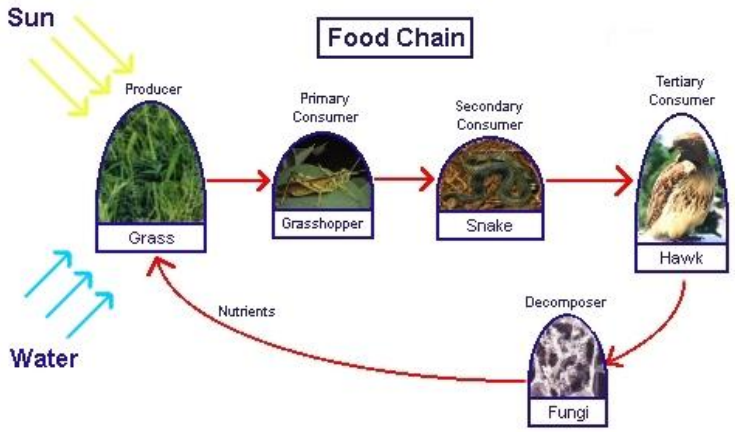
Numbers of Organisms:

In any food web, energy is lost each time one organism eats another. Because of this, there have

to be many more plants than there are plant-eaters. Therefore, there are more plant-eaters than meat-eaters. Although there is intense competition between animals, there is also an interdependence. When one species goes extinct, it can affect an entire chain of other species and have unpredictable consequences.

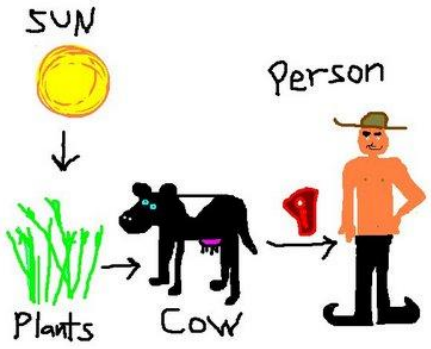
Equilibrium

As the number of carnivores in a community increases, they eat more and more of the herbivores, decreasing the herbivore population. It then becomes harder and harder for the carnivores to find herbivores to eat, and the population of carnivores decreases. In this way, the carnivores and herbivores stay in a relatively stable equilibrium, each limiting the other's population. A similar equilibrium exists between plants and plant-eaters.



http://www.jenningsk12.net/WE/peimann/Science/FoodChains/food_chain.jpe

Humans in a Food Chain:



http://1.bp.blogspot.com/_pmft7_D7Ig4/RxlfYwV2gtI/AAAAAAAAAK8/E7Eidoq-99E/s400/food+chain.bmp

Useful Websites:

Food Chain activities online:
http://www.sheppardsoftware.com/content/animals/kidscorner/foodchain/foodchain.htm

Action Synopsis

Students will demonstrate the interconnectedness among organisms in an ecosystem by "acting out" specific animals in a food chain. More importantly, students will recognize the role of humans in a food chain by adding the human component to the chain. Students will explain the connection between ourselves and the living things around us.

Time

1 session

Desired Outcomes

Students will:

- Define a food chain.
- Identify the role of humans in a food chain.

What You'll Need

For Each Student

 Pencils

For Whole Class

 Food Chain ID Cards (individual cards for each organism explaining their job in the food chain).

- Sun
- Grass
- Cow
- Human
- Fungi

 Food Chain Worksheet or Butcher Paper for variation
(Variation: Students look through magazines and/or grocery inserts and create a food chain with humans in it)

 Crayons/Markers

Preparing for the Lesson

Leaders will:

- Create cards showing an example of each type of organism in a food chain by putting a picture, name of the animal, and an example of what it eats on each card (be sure to correlate the name of one animal as the food for another animal, thus linking the food chain).

- Use string to make the cards into necklaces in order to free the hands of the participants in the lesson.

New Vocabulary

Food Chain
The sequence of who eats whom in a biological community (an ecosystem) to obtain nutrition.

Producer
Organisms that make their own food from sunlight (and/or chemical energy from deep sea vents) and are the base of every food chain.

Consumer
Animals that obtain nutrition by eating other living things. A primary consumer eats plants and is considered an herbivore. Secondary consumers and those that follow are either omnivores (plant and meat eating) or carnivores (meat eating only).

Decomposer
Organisms that break down the remains of living things in order to recycle nutrients back into the ecosystem.

Assessments

Journal Activity: "What is a 'Food Chain'?"

Post – Assessment: Students will draw themselves in a food chain. (May be a journal activity for following lesson.)

Lesson Sequence

1. Have the students sit in front of the chalk board with their journals. Ask students to volunteer to share their journal responses about food chains. Allow several students to answer. You may want to write some of their responses on the board, as well as any drawings that may offer a good explanation of a food chain.

<u>Review:</u>

2. Remind the students that we have been studying ecosystems. Ask students:

   "Are we part of an ecosystem?" "Why/why not?" (This should be a review, as students have been studying their neighborhood as an ecosystem.) Allow several student answers. Students should gather that we ARE a part of an ecosystem because we are living organisms in an area with other living as well as nonliving things.
   (5 minutes)

Introduction:

3. Explain to the students that living things in an ecosystem are connected by what they eat. We call this connection the food chain because of how it links living things together in an ecosystem.

4. On the far right end of the board, write the word "Human." Ask the students to name something that humans eat (ex: chicken). Write/draw that item on the board to the left of the "human". Draw an arrow from the food (chicken) to the "human" to connect them.

   Ask the students "What does the chicken eat?" Allow students to answer – they should plant material (i.e. corn, seeds, etc.). Write/draw the corn to the left of the chicken. Draw an arrow from the corn to the chicken to connect them.

   Ask the students "What does the corn eat?" Allow students to answer – they should understand that plants take energy from the sun, carbon dioxide, water, and nutrients from the soil to make their food (photosynthesis). Write/draw the sun and water to the left of the corn. Draw an arrow from the sun/water to the corn to connect them.

   Review the diagram on the board with the students. Here is an example.

Sun, Water → Corn → Chicken → Human

(10 – 15 minutes)

Activity Part I:

5. Introduce the activity by explaining that the students are going to "act out" a food chain. Pass out the ID card necklaces to students (volunteers may be recruited for larger class size). DO NOT PASS OUT THE HUMAN ID CARD. Have the students try to arrange themselves in a food chain based on what they've learned so far. (This could be useful in assessing the students' understandings of what they've learned so far.
   (2 – 3 minutes)

6. Once the students have arranged themselves, have them sit down in that order. Remind the students that each living thing has a job in an ecosystem, and that job is mostly about energy. Explain that living things get energy from food. Explain that some living things make their food by absorbing (soaking up) energy from the sun. Recognize the "sun" and "grass" students. State that others need to consume (eat) living things in order to get the energy they need to survive. Recognize the "cow" and "human" students. Some living things decompose (break down) the remains of living things in order to put nutrients (vitamins and minerals) back into the ecosystem to be used again. Recognize the "fungi" student.

Activity Part II:

7. For the activity, explain and demonstrate to the students that in each part of the food chain there is an action that the participants will do:
   - absorption (demonstrate by reaching both arms up and pulling energy down towards yourself)
   - consumption (demonstrate by motioning your hands towards your mouth to represent eating)
   - decomposition (demonstrate by motioning your hands as if you are breaking something apart)
   ALSO, explain that students should touch feet with one another as they link to their chain. (This will reinforce the connectedness among the students in the food chain.)

8. Ask: "Where does our energy come from first? What gives our planet energy? Heat? Light? – The SUN! Have the student with the "sun" necklace come to the front of the group and stand facing the group.
   Ask: "What does it look like when the sun is sending the earth energy?" The student should then "act" like the sun, sending energy out to others.

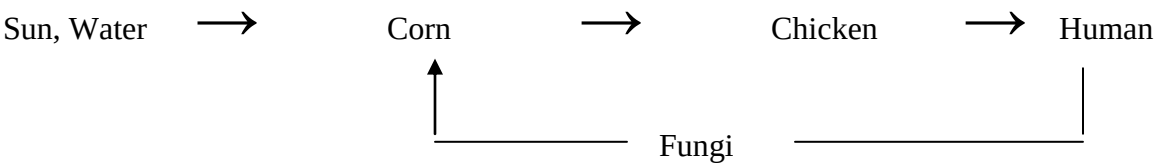
9. Ask: "What living thing uses the sun's energy to make food?" You may need to hint that it is usually green. – PLANTS! Have the student with the "grass" necklace come to the front of the group and stand facing the group.
   Ask: "Is the grass, absorbing, consuming, or decomposing?" (Answer: Absorbing.)
   Student should then "act" like the grass, motioning the absorption of energy from the sun.

10. Ask: "Which living thing eats the grass to get energy?" – COW! Have the student with the "cow" necklace come to the front of the group and stand facing the group.
    Ask: "Is the cow absorbing, consuming, or decomposing?" (Answer: Consuming.)
    Student should then "act" like the cow, getting energy by consuming grass.

11. Ask: "When plants and animals die, which living thing is left to clean up the rest?" – FUNGI! Discuss with students the important role of decomposers as organisms that break down dead plants and animals to recycle nutrients back into the soil for plants to use later.
    Ask: "Is fungi absorbing, consuming, or decomposing? (Answer: Decomposing.)
    Student should then "act" like fungi, getting energy by breaking down dead things.

12. Once students have built their food chain, introduce the human ID card to the group.
    Ask: "Where do humans fit in this food chain?" Students should recognize that we get meat from cows and that most people eat meat.
    Ask: "Are we absorbing, consuming, or decomposing?" (Answer: Consuming.)
    Ask: "Would you say that we are connected to this food chain? How?" Students should be able to explain that humans are connected to the food chain by the foods we get from our environment.

13. Go back to the food chain diagram on the chalk board. Have students label each part as a producer or a consumer. THEN, have students add a decomposer into the food chain. (20 – 30 minutes)



14. Using the "You in the Food Chain!" worksheet, have students draw themselves in a food chain.

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Science	
Standard 1.0 Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.	**Constructing Knowledge** (2)(3)1.A.1.b – Seek information through reading, observation, exploration, and investigations. **Applying Evidence and Reasoning** (2)(3)1.B.1.b – Develop reasonable explanations for observations made, investigations completed, and information gained by sharing ideas and listening to others' ideas. **Communicating Scientific Information** (2)(3)1.C.1.a – Describe things as accurately as possible and compare observations with those of others. (2)(3)1.C.1.c – Draw pictures that correctly portray at least some features of the thing being described and sequence events (seasons, seed growth).
Standard 3.0 Life Science: Students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.	**Ecology** (2)3.F.1.b – Explain that organisms live in habitats that supply their basic needs. • Food • Water • Air • Shelter

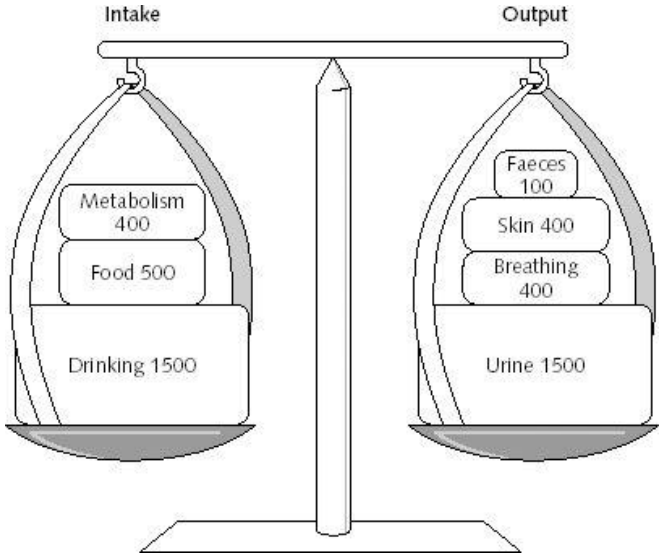
Module 6 • Lesson 3 • Am I an Ecosystem?

Background for Teachers:

Homeostasis and Ecological Balance

Homeostasis is defined as the tendency of a system, esp. the physiological system of higher animals, to maintain internal stability. Ecosystems maintain homeostasis when the inputs entering the system are balanced with the outputs leaving the system.

The human body has functions similar to those of an ecosystem because it also has inputs entering and outputs leaving the human body system. The human body uses internal processes to maintain homeostasis within this system.



Ex: Balance between typical fluid intake and output in a 70 kg adult. (Values are ml per 24 hours.)
From http://www.answers.com/topic/water-balance-1

Action Synopsis

Students think and talk more about ecosystems; refining their ideas. They use art to explore the question of whether the human body is an ecosystem.

Time

1 session

Desired Outcomes

Students will:

- Develop, for other students, a written explanation of what an ecosystem is
- Explain why they think the human body is, or is not an ecosystem
- Demonstrate the inputs and outputs of the human body

What You'll Need

For Each Student

 Butcher paper
 Crayons or Markers

For Whole Class

 What Is An Ecosystem? Poster
 Poster or chart paper
 A simple balance scale (see option below if scale is unavailable)
 9 plastic bags (sandwich-size) containing rice or beans (pre-measured and labeled) to demonstrate inputs and outputs of the human body as an ecosystem.

***Inputs** (labeled in green) – food, water/liquids, sunlight, air/oxygen*

Food – 1 cup
Water/Liquids – 1 cup *= 3 cups total*
Sunlight – ½ cup
Air/Oxygen – ½ cup

***Outputs** (labeled in purple) – sweat, urine, feces, heat, carbon dioxide*

Feces – 1 cup
Urine – 1 cup
Sweat – ½ cup *= 3 cups total*
Heat – ¼ cup
Carbon dioxide – ¼ cup

***Note:** The total amount of inputs will equal the total amount of outputs to demonstrate a balanced ecosystem.*

Should a balance scale NOT be available, you can use the board to add the amounts of inputs and outputs to show how they can be equal to each other in a balanced ecosystem, as well as one being greater/less than the other in an unbalanced ecosystem.

Preparing for the Lesson

Leaders will:

- On poster paper, write heading only *What Is An Ecosystem?* in big letters.
- Hang the *What Is An Ecosystem? Poster* in an easily accessible area.

New Vocabulary

Dehydration

A state of unbalance in your body that occurs when the fluids going in (input) is LESS than the wastes going out (output).

Homeostasis

A state of balance in your body. Homeostasis occurs when there is a balance of input (food and fluids) going to our body and output (sweat and wastes) leaving our body.

Organism

Any cellular living thing whose different components work together as a whole to carry out life processes.

Assessments

- Responses on the *What Is An Ecosystem? Poster*
- Thinking as to why the human body is an ecosystem
- Drawing and labeling of inputs/outputs of student's own body ecosystems

Lesson Sequence

1. Draw students' attention to the *What Is An Ecosystem? Poster*. Have them work together to come up with an explanation of "ecosystem" that will help other students in the school understand what an ecosystem is. (If necessary guide the students to include some mention of inputs and outputs.)
   (10 minutes)

2. Write the students' explanation on the poster and hang it just outside the classroom door to share with other students in the school. This will also remind your students of what an ecosystem is each day when they come inside the classroom.

3. Tell the students that the previous lesson focused on ecosystems in the schoolyard. Pose a new challenge: Am I an ecosystem? Are you an ecosystem?

4. Encourage the students to answer the question: "Am I an Ecosystem?"
   As they respond ask for the **WHY** behind their answers. Encourage them to apply the definition of an ecosystem to their own bodies.

5. After several students have shared their points of view (to serve as an informal assessment) explain to the students the ways in which the human body acts like an ecosystem. Some talking points include:

- We eat food and drink fluids (inputs)
- We excrete waste like urine and feces and we sweat. (outputs)
- We depend on internal (inside our bodies) and external (outside of our bodies) things to survive.
- Our weight demonstrates or shows how we are an ecosystem: If we take in more calories from what we eat and drink than we put out exercising and maintaining our bodies, we gain weight. Why? Because our inputs and outputs are not in balance.

Demonstration:

Students will model homeostasis by balancing inputs and outputs on a balance scale. They will demonstrate factors that cause unbalance such as obesity and dehydration using inputs and outputs on the scale.

1) Present the balance scale to the students. Ask the students if they've seen this tool before. Explain that our bodies work like a balance scale, keeping track of our inputs and outputs.

2) Present the plastic bags of inputs and outputs. Ask the students to show what homeostasis looks like using the scale. Students should place a balanced amount of inputs and outputs on the scale.

Inputs = Outputs

3) Review the concept of gaining weight, from the previous discussion. Ask students to show what gaining weight looks like. Students should place more inputs than outputs on the scale, creating an unbalance in the human ecosystem.

Inputs > Outputs

Ask the students: "How does this unbalance affect people?" Allow for student answers (Ex. they get bigger, they are unhealthy, they can't walk very well, etc.)
The issue of weight could be a sensitive subject for some students. If there is a foreseen discomfort, this part of the demonstration can be omitted from the demonstration. Gaining weight should still be discussed in the talking points.

4) Ask students if they know what dehydration means. Allow for student answers. Explain that our bodies get dehydrated when we are not drinking enough liquids to make

up for the amounts of fluids we are losing. Ask students to show what dehydration looks like. Students should place more outputs (sweat, urine) than inputs (liquids) on the scale, creating an unbalance in the human ecosystem.

Inputs < Outputs

Ask the students: "How does this unbalance affect people? What does it feel like when you are dehydrated?" Allow for student answers (Ex. you are tired, you feel hot, you can't run around, you get cranky)
(20 minutes)

7. On the top of 2 different sheets of chart paper or on the chalkboard, write INPUTS and OUTPUTS, leaving room under each. Have the students list as many inputs and outputs to their body ecosystem as possible.
   - Some inputs include: water, other drinks, food, medicine, vitamins, sunlight, air/oxygen, etc.
   - Some outputs include: wastes (urine/feces), sweat, carbon dioxide, heat, etc.

   (10 minutes)

8. Explain that the students will now be making body ecosystems. You will trace the outline of each student's body on a large piece of butcher paper leaving plenty of room at the top, bottom and sides of the sheet. Explain to the students that they will be adding onto their body tracing the inputs to their body and outputs from their body. Ideally they will draw and label each input and output. If students are unsure or embarrassed about drawing wastes or anything else, you may have them simply write the word instead of drawing a picture.

9. Spread the students out around the room and start tracing! Encourage the students to have fun as they draw and label everything that goes into and comes out of their personal body ecosystem.
   (20 – 30 minutes)

Maryland SC Standards (2nd and 3rd Grade): *Standards are presented in the following format:* *(Grade)Standard.Topic.Indicator.Objective – Objective Statement*	
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Standard 3.0 Life Science: Students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.	**Ecology** (2)3.F.1.b – Explain that organisms live in habitats that supply their basic needs. • Food • Water • Air • Shelter

Module 6 • Lesson 4 • What is Food Anyway?

Background for Teachers:

(from MedlinePlus at http://www.nlm.nih.gov/medlineplus/nutrition.html)

Nutrition

Food provides the energy and nutrients you need to be healthy. Nutrients include proteins, carbohydrates, fats, vitamins, minerals and water.

Dietary Proteins

Protein is in every living cell in the body. Our bodies need protein from the foods we eat to build and maintain bones, muscles and skin. We get proteins in our diet from meat, dairy products, nuts and certain grains and beans. Proteins from meat and other animal products are complete proteins. This means they supply all of the amino acids the body can't make on its own. Plant proteins are incomplete. You must combine them to get all of the amino acids your body needs.

It is important to get enough dietary protein. You need to eat protein every day, because your body doesn't store it the way it stores fats or carbohydrates. The average person needs 50 to 65 grams of protein each day. This is the amount in four ounces of meat and a cup of cottage cheese.

Carbohydrates

Carbohydrates are one of the main types of food. Your liver breaks down carbohydrates into glucose (blood sugar). Your body uses this sugar for energy for your cells, tissues and organs.

Carbohydrates are called simple or complex, depending on how fast your body digests and absorbs the sugar. You get simple carbohydrates from fruits, milk products and table sugar. Complex carbohydrates include whole grain breads and cereals, starchy vegetables and legumes. Complex carbohydrates and some simple carbohydrates provide vitamins, minerals and fiber. Products made with refined sugar provide little nutrition. It is wise to limit these products.

Dietary Fats

Fat is a major source of energy and aids your body in absorbing vitamins. It's important for proper growth, development and keeping you healthy. Fat provides taste to foods and helps you feel full. Fats are an especially important source of calories and nutrients for infants and toddlers. Dietary fat also plays a major role in your cholesterol levels.

But not all fats are the same. You should try to avoid

- *Saturated fats such as butter, solid shortening, lard and fatback*
- *Trans fats, found in vegetable shortenings, some margarines, crackers, cookies, snack foods and other foods made with or fried in partially hydrogenated oils*

Try to replace them with oils such as corn, canola, olive, safflower, soybean and sunflower. Of course, eating too much fat will put on the pounds.

Vitamins

Vitamins are substances that your body needs to grow and develop normally. There are 13 vitamins your body needs. They are vitamins A, C, D, E, K and the B vitamins (thiamine, riboflavin, niacin, pantothenic acid, biotin, vitamin B-6, vitamin B-12 and folate). You can usually get all your vitamins from the foods you eat. Your body can also make vitamins D and K. People who eat a vegetarian diet may need to take a vitamin B12 supplement.

Each vitamin has specific jobs. If you have low levels of certain vitamins, you may develop a deficiency disease. For example, if you don't get enough vitamin D, you could develop rickets. Some vitamins may help prevent medical problems. Vitamin A prevents night blindness.

The best way to get enough vitamins is to eat a balanced diet with a variety of foods. In some cases, you may need to take a daily multivitamin for optimal health. However, high doses of some vitamins can make you sick.

Minerals

Minerals are important for your body to stay healthy. Your body uses minerals for many different jobs, including building bones, making hormones and regulating your heartbeat.

There are two kinds of minerals: macrominerals and trace minerals. Macrominerals are minerals your body needs in larger amounts. They include calcium, phosphorus, magnesium, sodium, potassium, chloride and sulfur. Your body needs just small amounts of trace minerals. These include iron, manganese, copper, iodine, zinc, cobalt, fluoride and selenium.

The best way to get the minerals your body needs is by eating a wide variety of foods. In some cases, your doctor may recommend a mineral supplement.

Drinking Water

Every living creature needs clean and safe drinking water. How much do you need? It depends - your size, activity level and the weather all make a difference.

The water you drink is a combination of surface water and groundwater. Surface water includes rivers, lakes and reservoirs. Groundwater comes from underground. The United States has one of the safest water supplies in the world, but drinking water quality can vary from place to place. It depends on the condition of the source water and the treatment it receives. Treatment may include adding fluoride to prevent cavities and chlorine to kill germs.

Useful websites:
US National Library of Medicine and the National Institutes of Health:
http://www.nlm.nih.gov/medlineplus/nutrition.html

Action Synopsis

Students will examine food as a source of nutrient input for their bodies. They will investigate the components of different foods as they relate to their functions in the body.

Time

1 session

Desired Outcomes

Students will:

- Identify foods as inputs of carbohydrates, proteins, fats, vitamins, and minerals
- Explain the function of each type of nutrient in the body
- Classify different foods as carbohydrates, proteins, fats, vitamins, and minerals

What You'll Need

For Each Group

- Sheet of butcher paper or poster board
- Grocery inserts (can be collected from local grocery stores at front of store) OR Food magazines
- Markers and Crayons
- Scissors
- Glue sticks

For Whole Class

- Slides showing the 5 nutrients and explanation of what they do for the body (in Leader Tools).

Preparing for the Lesson

Leaders will:

- Read the "Background for Teachers" at the beginning of Lesson 4
- Arrange all materials for students
- Clear the chalkboard for use during discussion (slides will be posted on the board)
- Find an area around the classroom or school where student collages can be posted at the end of the lesson
- Make a banner with the title "Food Gives Us Many Things!" to post with student work.

New Vocabulary

Carbohydrates
Mainly sugars and starches, that serve together as one of the three principal types of nutrients used as energy sources (calories) by the body.

Fats
One of the three nutrients used by the body as energy. The other nutrients are carbohydrates and proteins.

Minerals
Elements found in different foods that support the body's health, growth, and function.

Nutrient
Any substance that provides nutrition to a living thing (i.e. carbohydrates, fats, minerals, proteins, vitamins).

Proteins
Complex molecules found in certain foods (such as meats, fish, and nuts) that develop, maintain, and replace tissues in your body.

Vitamins
Substances that are found in different foods that support the body's health, growth, and function. For example:

Vitamin D in milk helps your bones.
Vitamin A in carrots helps you see at night.
Vitamin C in oranges helps your body heal if you get a cut.
B vitamins in leafy green vegetables help your body make protein and energy.

Assessments

Journal Activity: "Is your body an ecosystem?" Students should answer yes/no to the question, explain WHY they chose their answer, and draw inputs and outputs of the human body. They may use work from the previous activity as a review if needed.

Lesson Sequence

1. Journal Activity: "Is your body an ecosystem?" Allow 10 – 15 minutes for this activity.

2. Have the students sit in front of the chalkboard. You may want to take a few minutes to have students share their body tracings from the previous activity.

   Remind the students that we talked about inputs and outputs for our bodies in the previous activity.

Ask the students: "Is food an input or an output?" "Why?" Allow students to answer, explaining the reasons they chose the answer they did. Ultimately, students should conclude that we get food from the outside environment and put it into our bodies. Therefore, food is considered <u>input</u>.

Ask: "What are some things in food that we need for our bodies?" Allow many student answers. Students should gather that food gives the body many things.

3. Introduce the slides to the students. One-by-one, review each slide with the students, and tape them to an area on the chalkboard. After each slide has been discussed, ask students to name some foods that can contain that particular nutrient. Write those examples below each slide. See examples below:

(Carbohydrates)
- bread
- pizza crust
- cereal
- crackers
- fruits

(Proteins)
- meat
- fish
- beans
- peanut butter

(Vitamins)
- fruit
- vegetables
- bread
- milk

(Minerals)
- milk
- fruits
- vegetables

(Fats)
- nuts
- butter
- oil

Note: The pictures on the slides show foods that are mainly unprocessed (i.e. they look almost exactly like they would in nature). It should be reinforced to the students that the foods with the most nutrients are those that aren't processed too much – in other words, they are "fresh" foods. It should also be mentioned that the foods that <u>are</u> processed aren't bad to eat (chips, hot dogs, etc.), but that they should be eaten sparingly and combined with the fresh foods.
(10 – 15 minutes)

4. Once students have brainstormed examples of nutrients on the board have them separate into groups. Each group should have a work area with grocery inserts/magazines, crayons/markers, scissors, glue sticks, and a sheet of butcher paper or poster board.

   Have the students divide their paper into 6 areas. Have them label each area with the nutrients from the slides on the board. *Students may need help with this.*

5. Explain to the students that they will be using the grocery inserts/magazines to find examples of foods that contain the nutrients discussed earlier. Remind them that some things fall into more than one group, but that they only have to put them into one.

   Allow the students to paste pictures under each category to show the types of foods that contain each nutrient. (20 – 30 minutes)

6. Once students have finished their collages, post the collages in an area of the school/classroom where other students can see. On a separate sheet of butcher paper, make a banner that says "Food Gives Us Many Things!" to post above the students' collages.

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Standard 3.0 Life Science: Students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.	**Ecology** (2)3.F.1.b – Explain that organisms live in habitats that supply their basic needs. • Food • Water • Air • Shelter

Module 6 • Lesson 5 • All in a Label!

Background for Teachers:

(Adapted from Kids Health at http://kidshealth.org/kid/stay_healthy/food/labels.html)

You know how books have a table of contents that explains what's inside? Or maybe you have a toy that came with a diagram that identified each small piece. Nutrition labels are sort of like that. They tell you what's inside the food you're eating and list its parts.

*The Nutrition Facts food label gives you information about which **nutrients** are in the food. Your body needs the right combination of nutrients, such as vitamins, to work properly and grow. The Nutrition Facts food label is printed somewhere on the outside of packaged food, and you usually don't have to look hard to find it. Fresh food that doesn't come prepackaged sometimes has nutrition facts, too.*

*Most nutrients are measured in **grams**, also written as **g**. Some nutrients are measured in **milligrams**, or **mg**. Milligrams are very tiny — there are 1,000 milligrams in 1 gram.*

*Other information on the label is given in **percentages**. Food contains fat, protein, carbohydrates, and fiber. Food also contains vitamins, such as A and C, and minerals, such as calcium and iron. Nutrition specialists know how much of each one kids and adults should get every day to have a healthy diet. The percent daily value on a food label tells you how this food can help someone meet these daily goals.*

On food labels, they base the percentages on a 2,000-calorie adult diet. So looking at the label above for two crackers, a grownup would see that they provide less than 1 gram of fiber, only 3% of the person's daily needs. So that means he or she would have to eat other foods to get 100% of the fiber needed each day. Similarly, the person would see that the crackers provide nothing toward the daily goals for vitamin A, vitamin C, calcium, or iron.

Comparing Labels

***Food labels aren't ideal for kids because they're calculated based on what adults need to eat.** A kid's diet might be more or less than 2,000 calories, based on your age, whether you are a boy or girl, and how active your are. Likewise, kids may need more or less of certain food components and nutrients, such as calcium and iron.*

But kids can still get important information from food labels. They can get a general idea about what the food contains, how much is in a serving, and how many calories are in a

serving. Kids also can use labels to compare two foods. Which one has more fiber? Which one has more fat? Which one has more calories per serving?

The ingredient list is another important part of the label. Ingredients are listed in order so you get an idea of how much of each ingredient is in the food. When something is listed first, second, or third, you know that this food probably contains a lot of it. The food will contain smaller amounts of the ingredients mentioned at the end of the list.

With that in mind, check ingredient lists to see where sugar appears. Limit foods that mention sugar in the first few ingredients. That means it's a very sugary food. Sugar has different names, so it might also be called high fructose corn syrup, corn syrup, sucrose, or glucose.

Serving Size

The nutrition label always lists a serving size, which is an amount of food, such as 1 cup of cereal, two cookies, or five pretzels. The nutrition label tells you how many nutrients are in that amount of food. Serving sizes also help people understand how much they're eating. If you ate 10 pretzels, that would be two servings.

Servings per Container or Package

The label also tells you how many servings are contained in that package of food. If there are 15 servings in a box of cookies and each serving is two cookies, you have enough for all 30 kids in your class to have one cookie each. Math comes in handy with food labels!

Calories and Calories from Fat

The number of calories in a single serving of the food is listed on the left of the label. This number tells you the amount of energy in the food. The calories in a food can come from fat, protein, or carbohydrate. People pay attention to calories because if you eat more calories than your body uses, you might gain weight.

Another important part of the label is the number of calories that come from fat. People check this because it's good to limit fat intake to about 30% of the calories they eat.

Total Fat

The total fat is the number of fat grams contained in one serving of the food. Fat is an important nutrient that your body uses for growth and development, but you don't want to eat too much.

The different kinds of fat, such as saturated, unsaturated, and trans fat, will be listed separately on the label.

Cholesterol and Sodium

These numbers tell you how much cholesterol and sodium (salt) are in a single serving of the food. They are included on the label because some people should limit the amount of cholesterol and salt in their diets. Cholesterol and sodium are usually measured in milligrams.

Total Carbohydrate

This number tells you how many carbohydrate grams are in one serving of food. Carbohydrates are your body's primary source of energy. This total is broken down into grams of sugar and grams of dietary fiber.

Protein

This number tells you how much protein you get from a single serving of the food. Your body needs protein to build and repair essential parts of the body, such as muscles, blood, and organs. Protein is often measured in grams.

Vitamin A and Vitamin C

These list the amounts of vitamin A and vitamin C, two especially important vitamins, in a serving of the food. Each amount is given as a percent daily value. Other vitamins may be listed on some labels.

Calcium and Iron

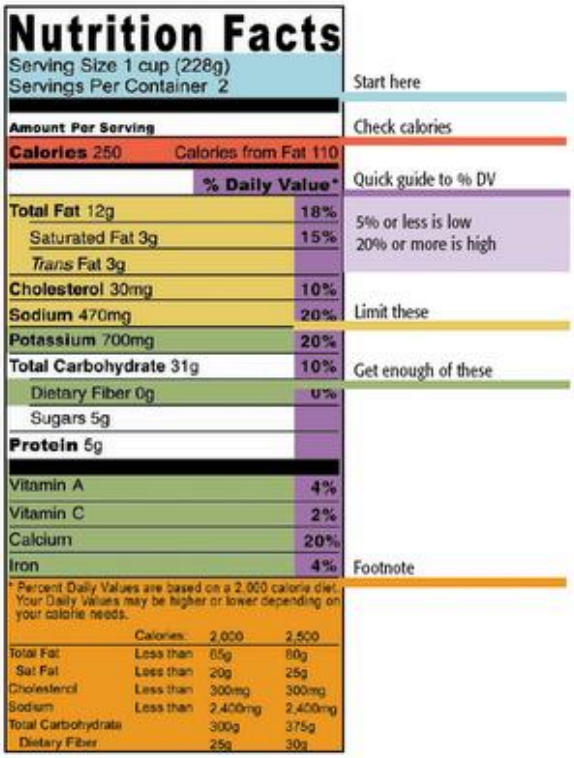
These list the percentages of calcium and iron, two important minerals, that are in a serving of the food. Again, each amount is given as a percent daily value and other minerals may be listed on the label.

Calories per Gram

These numbers show how many calories are in one gram of fat, carbohydrate, and protein. This information is the same for every food and is printed on the food label for reference.Now that you know a little more about food labels, you can read up on what you're eating!

Reviewed by: Mary L. Gavin, MD
Date reviewed: April 2008

A sample guide to reading a Food Label:



http://1.bp.blogspot.com/_5GRPD5-oXU4/SWLvTjV2dPI/AAAAAAAABuQ/-99gPTk8954/s400/img_tips_food_label.gif

Useful websites:
US Food and Drug Administration Food Label Overview:
http://www.fda.gov/Food/LabelingNutrition/ConsumerInformation/ucm078889.htm

Kid's World Nutrition Information:
http://www.agr.state.nc.us/cyber/kidswrld/nutrition/Labels.htm

Action Synopsis

Students will become introduced to food labels by investigating some of the information listed on them. They will compare snack foods with different nutritional quality using food labels (calories per serving, main ingredients, serving size). Students will identify healthy snack foods as alternatives to less healthy ones based on the information gathered.

Time

1 session

Desired Outcomes

Students will:

- Identify and read key components to a Nutrition Facts label for a common snack food.
- Compare different snack foods using nutritional data.
- Suggest one healthy snack food in replacement of a less healthy counterpart.

What You'll Need

For Each Student

□ Journals
□ Pencils

For Each Group (It is recommended that students be paired as one 2nd and one 3rd grader when possible)

Per pair (6 pairings or students may work individually):

□ Food Label Investigation Sheet
□ A snack food – one of the following:

1. raisins
2. packet of fruit snacks
3. pretzels
4. potato chips
5. Gatorade
6. Bottled water (or box juice)

Per group (2 pairs combined):

□ Food Comparison Sheet
□ Samples of their snack foods to compare (raisins/fruit snacks, pretzels/potato chips, Gatorade/box juice)

For Whole Class

□ Samples of food labels on food packages (ex: a bag of chips, box of pretzels, soft drink can)

(Students can be asked the day before to save one item from their snack/lunch that shows a food label.)

Preparing for the Lesson

Leaders will:

- Copy the "Food Label Investigation Sheets" (1 per pair)
- Copy the "Food Label Comparison Sheets" (1 per group)
- Arrange the snack foods for the student pairs to analyze

New Vocabulary

Label
A written or printed article used to provide information about something.

Ingredients
The parts of any mixture or combination.

Assessments

Journal Activity: "What are nutrients?" "What do they do for your body?"

Post – Assessment: Students will present their data and conclusions regarding healthy snacks at the end of the activity and select a healthy snack alternative to a less healthy food.

Lesson Sequence

1. Journal Activity: "What are nutrients?" "What do they do for your body?" Allow 10 minutes for this activity.

2. Once students have completed their journal activity, have the students bring their journals to the chalkboard area and sit down as a class.

3. Write the question "What are nutrients?" on the board. Begin a brief discussion with the students, having them share their journal responses to the question. Write their answers on the board. Examples may include input, food, vitamins, minerals, fats, proteins, carbohydrates…

4. Ask the students: "How do you know if what you are eating has nutrients in it?" Allow for several student answers.

5. Distribute the handout: "What's in a Food Label?" and review it with the students. Students should understand that food labels give us information about what is in the food.

6. Pass around a box or bag of food that has a food label on it. Allow the students time to look at the food label on it.
   Ask the students: "How does this label look similar to the one on your handout?" "How does it look different?"

   Students should see that the labels have the same types of categories on them (i.e. serving size, calories, etc.), but that there are different amounts (numbers). Explain to the students that they are different because they are different foods and have different ingredients.

7. Bring the students' attentions to the Ingredients below the food label. Ask students to name some of the words (ingredients) they recognize. Then ask the students to identify ingredients that they don't recognize.

   Explain to the students that the ingredients are organized by the amount of each part in the food. The **first** ingredient on the list makes up the **most** amount of the food. The last ingredient makes up a very small amount of the food.

7. Inform the students that they will be studying some snack foods using the food labels and ingredients on the package. They will also be able to taste the foods at the end of the activity!

8. Arrange the students in pairs (preferably one 3rd grader and one 2nd grader if possible) and have them sit in work areas arranged at the tables/desks. Distribute the snack foods and "Food Label Investigation" worksheet.

   Remind the students not to taste their foods until they are given permission (at the end of the group activity).

   Allow 10 – 15 minutes to complete the Partner Work activity.

9. Once partners have gathered their data, join two pairs into one group. IMPORTANT: The groups should comprise of similar snack foods (ex: raisins and fruit snacks). Have the students work in a group to compare their two snack foods. Students should complete the Food Comparison Sheet as group work.

Note: Students will be able to taste both snack foods in their groups. ***Please be sure that students have washed their hands.***

10. Once the group work has been completed, have the student groups share their findings with the class. Also, student groups should select the healthiest snack food between each pair based on their data.

11. Discuss the findings as a group. You may find that students feel that the less healthy snack tastes better than the healthier one. Why?

    Also, you may want to remind students that while some snacks are healthier than others, it is okay to eat the less healthy snacks once in a while.

Variation: If resources are available, you can allow all students to sample each snack food.

Maryland SC Standards (2nd and 3rd Grade): *Standards are presented in the following format:* *(Grade)Standard.Topic.Indicator.Objective – Objective Statement*	
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Standard 3.0 Life Science: Students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.	**Ecology** (2)3.F.1.b – Explain that organisms live in habitats that supply their basic needs. • Food • Water • Air • Shelter

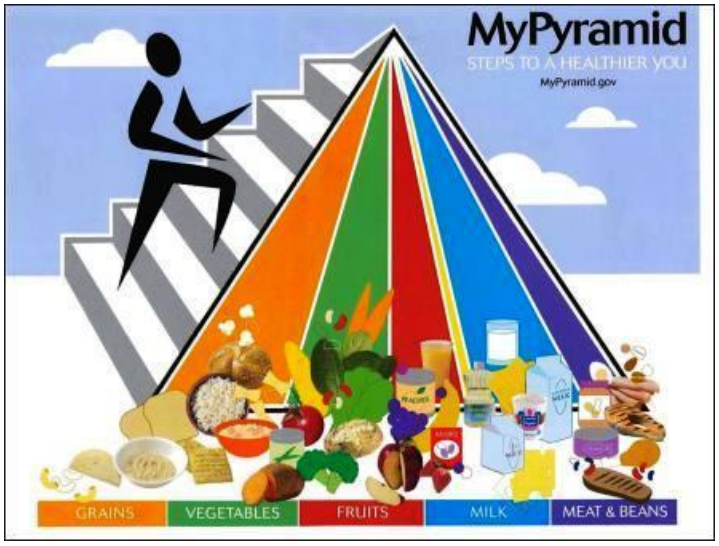
Module 6 • Lesson 6 • Go, Slow, and Whoa!

Background for Teachers:

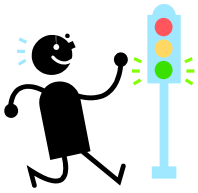
(Adapted from Kids Health at: http://kidshealth.org/kid/stay_healthy/food/go_slow_whoa.html)

*Lots of kids want to know which foods to eat to be healthy or lose weight. Most kids don't need to be on diets, but here's something kids **can** do to eat healthier: Learn the difference between Go, Slow, and Whoa foods.*

The Food Guide Pyramid puts food into these categories: grains, vegetables, fruits, milk and dairy products, meat, beans, fish, and nuts, and oils. See the pyramid below:



*But now, foods can be classified in three groups: **Go, Slow, and Whoa**. In 2005, the U.S. National Heart, Lung, and Blood Institute (part of the National Institutes of Health) suggested kids start thinking about whether foods are Go foods, Slow foods, or Whoa foods.*

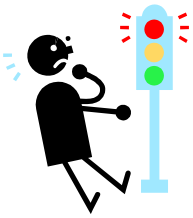


Go Foods

These are foods that are good to eat almost anytime. They are the healthiest ones. Example: skim and low-fat milk.

Slow Foods

These are sometimes foods. They aren't off-limits, but they shouldn't be eaten every day. At most, eat them several times a week. Example: waffles and pancakes.



Whoa Foods

These foods should make you say exactly that — Whoa! Should I eat that? Whoa foods are the least healthy and the most likely to cause weight problems, especially if a person eats them all the time. That's why Whoa foods are once-in-a-while foods. Example: French fries.

You will find a chart of Go, Slow, and Whoa foods in your Leader Tools. You can print this article so you can refer to the chart and learn which foods are which. In addition, a web link is included in the "Useful Websites" section should you want to print a larger Food Pyramid to post in the classroom.

Reviewed by: Mary L. Gavin, MD
Date reviewed: February 2009

Useful websites:
"Go, Slow, and Whoa" Foods Chart from the National Institutes of Health:
http://www.nhlbi.nih.gov/health/public/heart/obesity/wecan/downloads/go-slow-whoa.pdf

USDA Food Guide Pyramid Handout and Coloring Page:
http://www.mypyramid.gov/kids/

Action Synopsis

Students will apply the National Institutes of Health (NIH) standards for "Go, Slow, and Whoa" foods and classify different types of foods based on their nutritional quality. They will continue their investigation by analyzing a daily food diary to classify their personal food choices as "Go,

Slow, or Whoa" foods. Finally, students will apply their knowledge of food types and complete a scavenger hunt for different foods at a local grocery store.

Time

2 sessions

Desired Outcomes

Students will:

- Identify one example of a "Go" food (high nutritional value), "Slow" food (moderate nutritional value), and "Whoa" food (low nutritional value).
- Classify foods as either "Go," "Slow," or "Whoa" foods.
- Relate these classifications to their own daily food choices.

What You'll Need

For Each Student

Session 1:

□ "Keeping a Food Diary" worksheet
□ Go, Slow, and Whoa" worksheet

(Variation: If you feel that students will have difficulty listing foods for these activities, you may choose to do this as one class using today's school lunch menu. See lesson sequence for details.)

For Each Group

Session 2:

□ Clipboards
□ "Go, Slow, and Whoa" Scavenger Hunt sheets

For Whole Class

Session 1:

□ Chart paper titled "Go, Slow, and Whoa!" (You may also make 3 columns on the chart for classifying students' go, slow, and whoa foods from their journals.
□ "Go, Slow, and Whoa" picture slides (for modified game of "Red Light, Green Light")

Session 2:

□ (Optional) Disposable camera for taking pictures of scavenger hunt and "Go, Slow, and Whoa" foods.

Preparing for the Lesson

Leaders will:

- Review the "Background for Teachers" section at the beginning of the lesson.
- Copy the "Go, Slow, and Whoa" foods tip sheet for students to bring home and share with families. *The sheet may have to be enlarged slightly for student use.* (located at http://www.nhlbi.nih.gov/health/public/heart/obesity/wecan/downloads/go-slow-whoa.pdf)
- Copy the "Keeping a Food Diary" worksheet (Session 1)
- Copy the "Go, Slow, and Whoa" worksheet (Session 1)
- Prepare chart for discussion of "Go, Slow, and Whoa" foods
- Cut out 4 red, 4 yellow, and 4 green squares (one sheet of construction paper can be folded into fours) and GLUE them to the back of the food cards for use in the "Red Light, Green Light" game:

Paper Color	Cards
Green ("Go")	Fresh fruits and vegetables
	Fat-free milk and cheeses
	Whole wheat bread and cereals
	Water
Yellow ("Slow")	Waffles and pancakes
	Vegetables with sauce
	Low-fat hot dogs
	Sports Drinks (i.e. Gatorade)
Red ("Whoa")	Fried food
	Whole milk and ice cream
	Candy
	Soda (regular)

* More cards can be made for the game using pictures from the internet and magazine/newspaper clippings

** ***Enrichment*** *opportunity: Students can make their own cards for the "Red Light, Green Light" game using pictures from magazines and newspapers.*

New Vocabulary

(From http://kidshealth.org/kid/stay_healthy/food/go_slow_whoa.html)

Added fats or sauces

Vegetables are on the Go list, but only when they're prepared without added fats or sauces. That means they are steamed, boiled, baked, or grilled without adding butter, other oils, or sauce.

Extra-lean and lean beef

Ground beef is used to make hamburgers, meatballs, taco filling, and other foods kids like. But there's more than one kind of ground beef. Stores sell it with different amounts

of fat in it. The healthiest kind – extra-lean – has the least amount of fat, so it's on the Go list. Lean ground beef has a little more fat, so it's on the Slow list. Regular ground beef has the highest percentage of fat, so it's on the Whoa list.

Light syrup and heavy syrup

Sometimes canned or packaged fruits are packed in syrup. Light syrup is OK, putting those fruits on the Slow list. But heavy syrup is really sugary, so those kinds of fruits are on the Whoa list.

Trans fats

Hydrogenated oils fall into this category. This kind of oil is used in crackers and snack foods, but it's been found to be very unhealthy for your heart. Some products are now advertising that they have 0 trans fats.

Types of milk

Milk comes in more varieties than just white and chocolate! Skim milk and 1% mild have the least fat, so they're on the Go list, while 2% milk has a little more fat, so it's on the Slow list. Whole milk has the most fat, so it's on the Whoa list.

Whole grains

Whole grains contain more fiber and nutrients than white flour, which is used to make white bread, pasta, and lots of other stuff. Instead, look for foods that contain these ingredients: whole wheat, whole-grain corn, oatmeal, whole oats, graham flour, brown rice.

Assessments

(Sesson 2 Post-Assessment) Scavenger Hunt Sheets provide a post-assessment for this activity.

Lesson Sequence

Session 1:

1. Journal Activity: "Keeping a Food Diary" Allow students at least 10 minutes to list the foods they have eaten in one day (last night's dinner – present). (10 minutes)

2. Once students have finished the journal activity, invite them to an area in front of the chalkboard with the "Go, Slow, and Whoa" chart posted.

3. Introduce the activity by showing the students the chart. Explain to them that foods can be put into many groups. Today, we are grouping them as "go" foods, "slow" foods, and "whoa" foods. Ask students:

   "What do you think "Go" foods would be?"

"What do you think "Slow" foods would be?"
"What do you think "Whoa" foods would be?"

Allow for many student answers. This is an opportunity to use inference skills making a prediction based on the words go, slow, and whoa as they relate to foods – there is no need to correct student answers for this activity.
(5 minutes)

8. Distribute the "We Can! Go, Slow, and Whoa Foods" handout to the students. Review the meanings of each category.

9. Distribute the "Go, Slow, and Whoa" foods worksheet. Explain to the students that they will use their journal from the beginning of the lesson and put the foods they've eaten into the 3 categories.

(Variation: If this is too difficult for the students, you may do this as one class on the board using today's school lunch.)
(15 – 20 minutes)

10. Gather the students in front of the "Go, Slow, and Whoa" foods chart and write student responses on the chart. Briefly discuss each column. Make comparisons between different columns to see if students ate mostly "go," "slow," or "whoa" foods.
(10 minutes)

11. Bring the students outside to the schoolyard or to an open area inside of the school (gym or wide hallway). Play a game of "Red Light, Green Light" with the students using the food pictures.

Procedure:

1) Present the card with only the picture showing.
2) Have students choose which type of food it is.
3) Flip the card over to show the color side.
4) Students move accordingly – run/walk quickly for green, walk slowly for yellow, stop moving completely for red.
5) Students should freeze each time you show the picture card in order to share their answers. Then continue to move accordingly.

(20 minutes)

Session 2:

1. Gather students in front of the chalk board with the "Go, Slow, and Whoa" foods chart posted from the previous activity. Review the different food categories with the students, using student journals as needed.

(5 minutes)

2. Separate the students into groups of 3 or 4 students (try to combine older and younger students). Distribute a pencil, clipboard, and scavenger hunt sheet to each group. Explain to the students that they will be walking to a grocery store/market to look for different "Go, Slow, and Whoa" foods.

3. Bring students to a nearby grocery store. Have them work in their groups to complete the scavenger hunt sheets. Once they have completed their sheets, briefly discuss the results as a class.
(45 minutes to one hour)

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Standard 4.0 Physical Education: Exercise Physiology - Students will demonstrate the ability to use scientific principles to design and participate in a regular, moderate to vigorous physical activity program that contributes to personal health and enhances cognitive and physical performance in a variety of academic, recreational, and life tasks.	**Nutrition and Physical Activity** (2)4.E.1.a – State why nutritious food provides a better source of energy for activity than junk food. (3)4.E.1.a – Discuss the relationship between food intake and its effect on physical activity.

Module 6 • Lesson 7 • Crash and Burn!

Background for Teachers:

(From Kids Health at http://kidshealth.org/parent/nutrition_fit/fitness/exercise.html#)

When most adults think about exercise, they imagine working out in the gym on a treadmill or lifting weights.

But for kids, exercise means playing and being physically active. Kids exercise when they have gym class at school, soccer practice, or dance class. They're also exercising when they're at recess, riding bikes, or playing tag.

The Many Benefits of Exercise

Everyone can benefit from regular exercise. Kids who are active will:

have stronger muscles and bones
have a leaner body because exercise helps control body fat
be less likely to become overweight
decrease the risk of developing type 2 diabetes
possibly lower blood pressure and blood cholesterol levels
have a better outlook on life

Besides enjoying the health benefits of regular exercise, kids who are physically fit sleep better and are better able to handle physical and emotional challenges — from running to catch a bus to studying for a test.

The Three Elements of Fitness

If you've ever watched kids on a playground, you've seen the three elements of fitness in action when they:

1. *run away from the kid who's "it" (**endurance**)*
2. *cross the monkey bars (**strength**)*
3. *bend down to tie their shoes (**flexibility**)*

Parents should encourage their kids to do a variety of activities so that they can work on all three elements.

Endurance is developed when kids regularly engage in aerobic activity. During aerobic exercise, the heart beats faster and a person breathes harder. When done regularly and for continuous periods of time, aerobic activity strengthens the heart and improves the body's ability to deliver oxygen to all its cells.

Aerobic exercise can be fun for both adults and kids. Examples of aerobic activities include: basketball, bicycling, ice-skating, inline skating, soccer, swimming, tennis, walking, jogging, running

Improving strength doesn't have to mean lifting weights. Although some kids benefit from weightlifting, it should be done under the supervision of an experienced adult who works with them.

But most kids don't need a formal weight-training program to be strong. Push-ups, stomach crunches, pull-ups, and other exercises help tone and strengthen muscles. Kids also incorporate strength activities in their play when they climb, do a handstand, or wrestle.

Stretching exercises help improve flexibility, allowing muscles and joints to bend and move easily through their full range of motion. Kids look for opportunities every day to stretch when they try to get a toy just out of reach, practice a split, or do a cartwheel.

The Sedentary Problem

The percentage of overweight and obese kids and teens has more than doubled over the past 30 years. Although many factors contribute to this epidemic, children are becoming more sedentary. In other words, they're sitting around a lot more than they used to.

According to the Kaiser Family Foundation, the average child is watching about 3 hours of television a day. And the average kid spends 5½ hours on all screen media combined (TV, videos and DVDs, computer time outside of schoolwork, and video games).

One of the best ways to get kids to be more active is to limit the amount of time spent in sedentary activities, especially watching TV or playing video games. The American Academy of Pediatrics (AAP) recommends that children under the age of 2 years watch no TV at all and that screen time should be limited to no more than 1-2 hours of quality programming a day for kids 2 years and older.

How Much Exercise Is Enough?

Parents need to ensure that their kids get enough exercise. So, how much is enough? All kids 2 years and older should get at least 60 minutes of moderate to vigorous exercise on most, preferably all, days of the week.

The National Association for Sport and Physical Education (NASPE) offers expanded activity guidelines for infants, toddlers and preschoolers:

Age	***Minimum Daily Activity***	***Comments***
Infant	*No specific requirements*	*Physical activity should encourage motor development*
Toddler	*1½ hours*	*30 minutes planned physical activity **AND** 60 minutes unstructured physical activity (free play)*
Preschooler	*2 hours*	*60 minutes planned physical activity **AND** 60 minutes unstructured physical activity (free play)*
School age	*1 hour or more*	*Break up into bouts of 15 minutes or more*

Infants and young children should not be inactive for prolonged periods of time — no more than 1 hour unless they're sleeping. And school-age children should not be inactive for periods longer than 2 hours. Reviewed by: Mary L. Gavin, MD
Date reviewed: February 2009

Useful websites:
Kids Health
http://kidshealth.org/parent/nutrition_fit/fitness/exercise.html#

American Heart Association
http://www.americanheart.org/presenter.jhtml?identifier=4596

Action Synopsis

Students will discuss their favorite activities as those that "crash" (do not provide physical exercise for body) and "burn" (aerobic activity that provides exercise for the body and burns calories). They will identify simple ways to incorporate exercise into their day, and create posters to display and share this information.

Time

1 – 2 sessions

Desired Outcomes

Students will:

- Identify one benefit of exercise for the body.
- Classify at least 1 action as a "crash" activity.
- Classify at least 1 action as a "burn" activity.

What You'll Need

For Each Student

□ Handout: "Get Up and Exercise!"
□ Drawing paper or butcher paper
□ Pencil

For Whole Class

□ Chart paper with 2 columns labeled "Crash" and "Burn"
□ Crayons/Markers
□ Book for Enrichment: "I'm Walking, I'm Running, I'm Jumping, I'm Hopping," by Richard Harris (if available)

Preparing for the Lesson

Leaders will:

- Read the "Background for Teachers" section at the beginning of Lesson 8
- Create the chart titled "Crash and Burn Activities" with 2 columns
- Copy the handout "Get Up and Exercise!"
- Gather all art materials for poster/sign drawing

New Vocabulary

Exercise
Bodily or mental activity especially for the sake of improving health.

Flexibility
Capable of being bent without breaking.

Assessments

Journal activity: "What do you do to exercise?"

Post-assessment: Students will design posters promoting exercise and its benefits.

Lesson Sequence

1. Journal activity: "What do you do to exercise?" Allow 5 – 10 minutes for this activity.

2. Gather the students in front of the chalkboard to share their journals. Allow students to volunteer to share their responses.
(5 – 10 minutes)

3. Reading/Discussion: Introduce the activity by distributing the handout "Get Up and Exercise!" Read this to the students, pausing at different times to ask the following questions:

   "What are some activities that you do that make you sweat and breath fast?"

   "What are some activities that you do that DON'T make you do those things?"

   "Who can stretch your legs straight in front of you and touch your toes?"

   "Has anyone ever felt happier after exercising (at recess, dancing, etc.)?"
   (10 minutes)

4. Prepare to bring the students **OUTSIDE**. Explain to them that they are going to walk outside. Encourage the students to pay attention to 1) how they are breathing and 2) what parts of their body they are using as they walk.

   When the students have arrived outside, briefly discuss the students' observations.

5. Have the students choose a different activity that involves the students' moving their bodies. Explain to the students that they are going to do this activity for one minute. Examples of activities could be running, skipping, hopping in place, doing cartwheels, jumping jacks, etc. You may want to have jump ropes available for students to use as well.

   After one minute, gather the students and have them compare their breathing and body movements from this activity to walking outside. Students should notice that they are breathing more rapidly (getting more oxygen) and that they used more of their body in this activity.

   Bring the students inside after the discussion and have them sit in front of the chalkboard. Present the chart titled "Crash and Burn" activities to the students.

4. Discuss the concept of "Crash" and "Burn" activities using the chart.

   Explain to the students that "crash" activities are the things that students choose to do that do not provide much exercise for the body. Examples include **playing video games** and **watching t.v.**

   Explain to the students that "burn" activities are the things that students choose to do that exercise the body and burn calories. The students participated in "burn" activities when they walked outside and exercised for 1 minute. Other examples include **running at recess, climbing, doing chores at home, dancing, etc.**

   Have students suggest activities and classify them on the chart as either "crash" and "burn." Write them on the chart.

   Ask the students to share reasons that could make them want to exercise (ex. their friends do it, they have a lot of energy, they like to play sports, etc.).

   Ask students to share reasons that could make it difficult for them to exercise (ex. the streets are too dangerous, they don't live close to a park, etc.).

   Ask the students to suggest activities they could do at home as ways to balance "crash" and "burn" activities. For example, students could do 25 jumping jacks for every video game they play.

   (10 – 15 minutes)

5. Have students work alone or in groups to design posters promoting "Burn" activities. These posters can be displayed around the school to teach others about the benefits of

exercise. Be sure to have students include: 1) Why exercise is healthy, and 2) One example of exercise that can be done instead of a "crash" activity.

(30 – 45 minutes)

6. Enrichment Activity: Read "I'm Walking, I'm Running, I'm Jumping, I'm Hopping," by Richard Harris (if available)

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Module 6 • Lesson 8 • Backyard Eating! (Visiting a Community Garden)

Background for Teachers:

What is a Community Garden?

According to American Community Garden Association, a community garden is simply any piece of land that is gardened by people.

It can be urban, suburban, or rural. It can grow flowers, vegetables or community. It can be one community plot, or can be many individual plots. It can be at a school, hospital, or in a neighborhood. It can also be a series of plots dedicated to "urban agriculture" where the produce is grown for a market. The benefits of community gardens are great and include the following:

Community Gardening

- *Improves the quality of life for people in the garden*
- *Provides a catalyst for neighborhood and community development*
- *Stimulates Social Interaction*
- *Encourages Self-Reliance*
- *Beautifies Neighborhoods*
- *Produces Nutritious Food*
- *Reduces Family Food Budgets*
- *Conserves Resources*
- *Creates opportunity for recreation, exercise, therapy, and education*
- *Reduces Crime*
- *Preserves Green Space*
- *Creates income opportunities and economic development*
- *Reduces city heat from streets and parking lots*
- *Provides opportunities for intergenerational and cross-cultural connections*

Useful websites:

American Community Garden Association
http://www.communitygarden.org/learn/

Community Greening Resource Network:
http://parksandpeople.org/programs_great_parks_greening_CGRN.html

Gardening Books for Children:
http://aggie-horticulture.tamu.edu/kinder/coolbks.html

Action Synopsis

Students will visit a local community garden to learn about the process of gardening as well as the health benefits of growing your own food. They will participate in some of the daily maintenance of the garden to improve the quality of the garden and in turn, their local ecosystem.

Time

1 – 2 sessions

Desired Outcomes

Students will:

- Describe at least two health benefits of gardening.
- Identify one way gardening in the community helps the ecosystem.

What You'll Need

For Each Student

□ Journal
□ Pencil

For Whole Class

□ Crayons/Markers
□ Disposable Camera (for documenting visit)
□ **Book:** Takiya and Thunderheart's Life Garden by **J. Victor McGuire** (Author), **Gershom Griffith** (Illustrator)

Preparing for the Lesson

Leaders will:

- Call the Parks & People Foundation (410-448-5663) for contact information for local community gardens and gardeners.
- Arrange a date and time for visiting a community garden with a participating gardener as a host.
- Provide gardener host with the Information for Community Gardeners sheet (see Leader Tools) **at least one week prior** to the visit via mail, fax, email, or speaking over the phone.
- Prepare student materials for the day (Journal for post-activity reflection and pencils, crayons/markers)

New Vocabulary

Harvest

To gather a crop when it has grown enough to be eaten.

Maintenance

The care and upkeep of something such as a garden.

Assessments

Journal Activity: Post-activity Reflections for Sessions 1 and 2

Lesson Sequence

Session 1:

1. Introduce the activity by explaining to the student's that they will be preparing to visit a community garden. Ask the students:

   Has anyone seen a garden in your neighborhood?

   What does it look like?

   What do you see people doing in the garden? Why do you think they are doing those things?

   What do you think those people do with the food they harvest (gather) from the garden?

   What do you think the land looked like BEFORE the garden was created?
   (10 minutes)

2. Read "Takiya and Thunderheart's Life Garden" with the students. Allow for short breaks if/when students appear restless. Once you've finished the story, briefly discuss it as a class. Ask the students:

   Did you notice anything in Takiya and Thunderheart's neighborhood that you also see in your neighborhood?

   What kind of people were Takiya and Thunderheart? Why do you think so?

3. Have students complete the Journal Activity.

Session 2:

1. Gather the students together in an area of the classroom. Remind the students that they will be visiting a community garden for today's activity. Also, explain to the students that they will be learning some skills at the garden to prepare them for planting their OWN garden at school. Ask the students:

   What do you think we will see when we are at the garden?

   What questions can we ask the gardener while we are there to help us for when we plant our garden?

   (5 – 10 minutes)

2. Bring students to the community garden.

   (1 hour)

3. When you return from the garden visit, have the students complete their Journal reflections. If time is limited, have students complete their journals on the following day.

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Standard 3.0 Life Science: Students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.	**Ecology** (2)3.F.1.b – Explain that organisms live in habitats that supply their basic needs. • Food • Water • Air • Shelter
Standard 4.0 Physical Education: Exercise Physiology - Students will demonstrate the ability to use scientific principles to design and participate in a regular, moderate to vigorous physical activity program that contributes to personal health and enhances cognitive and physical performance in a variety of academic, recreational, and life tasks.	**Nutrition and Physical Activity** (2)4.E.1.a – State why nutritious food provides a better source of energy for activity than junk food.

Module 6 • Lesson 9 • Plan the Garden

Background for Teachers:

(From: "Eat a Rainbow!" at http://www.nutrition.ecsd.net/eat%20a%20rainbow.htm)

The colors of fruits and vegetables tell you a lot about their nutrional values. Within each color are brightly colored, disease-fighting phytochemicals. Study after study proves their healing power. Evidence suggests that single plant pigments need other phytochemicals within that plant and from others to provide all their benefits. Supplements do not offer the same protective benefits as foods.

The Yellow-Oranges

Secret Ingredients: beta carotene, alpha carotene

- *Cancer Fighter: Carotene acts as our defense mechanism to resist carcinogens. Carotenoids in fresh food can offset the effects of exposure to environmental toxins such as air pollution and cigarette smoke.*
- *Natural Sunblock: Yellow and orange foods can act as our body's own sun-protectant.*
- *Skin: keeps eyes and skin healthy*

The Reds, Purples and Blues

Secret Ingredients: anthocyanin, betacyanin, proanthocyanidins

- *Brain Rejuvenators: Red and blue fruit such as blueberries and strawberries are packed with anthocyanin pigments, which are very potent antioxidants and anti-inflammatories. They rid the body of free radicals and cytokines, which have been linked with neural and cellular breakdown from aging.*
- *Heart Champions: The purple anthocyanin in black rice can reduce levels of LDL (bad cholesterol). It may also prevent your arteries from clogging up. The anti-inflammatory properties may also benefit people with arthritis.*
- *Lower your Risk for Cancer: Anthocyanin pigments in fresh and dried berries may help help boost resistance to breast cancer.*

The Orange Reds

Secret Ingredients: lycopene, beta carotene, zeta carotene

- *Cancer Fighter: This pigment will help fight prostrate cancer and will reduce the risk of ovarian cancer.*
- *Lung Defense: Lycopene and carotene rich foods may substantially reduce your risk of lung cancer, as well as other cancers.*
- *Heat releases the beneficial tomato pigments; adding some oil will make it easier for your body to absorb lycopene.*

The Greens

Secret Ingredients: lutein, beta carotene, and chlorophyll

- *Visionary Vegetables: Green chlorophyll has disease-fighting, but it's the yellow under-pigment, lutein, in leafy greens that really benefits eye health. Eyes absorb lutein which protects them from light and free radical damage.*
- *Cancer Fighter: Dark leafy vegetables, like spinach and broccoli, help build resistance to colon cancer.*

Useful websites:
North Dakota State University food and nutrition article:
http://www.ag.ndsu.edu/pubs/yf/foods/fn595w.htm

A Rainbow of Nutrition (Kids Website and Activities)
http://vickids.tamu.edu/nutrition/index.html

Action Synopsis

Students plan where they will plant their schoolyard vegetable garden. They choose vegetables to grow based on color and nutritional inputs and use planting guidelines to create a garden layout.

While the 4th and 5th grade students will be planning their own pollinator garden, you may want to collaborate with them for the gardening activities.

Time

1 – 3 sessions

Desired Outcomes

Students will:

- Demonstrate an understanding of the Planting Guideline criteria
- Integrate the guidelines into their garden designs
- Demonstrate enthusiasm in their garden drawings and pictures of themselves eating vegetables

What You'll Need

For Each Student

□ Handout: Planting Guidelines for Cool Weather Crops
□ Graph Paper

For Each Student

- Crayons or Markers
- Drawing paper
- Community Garden pictures
- Principal's Letter

For Whole Class

- Large poster with graph lines

People Power

Try to get volunteers to help with the planning lesson. (the Parks and People Foundation, Master Gardeners, 4-H staff, graduate students from the Morgan State University Department of Landscape Architecture would be ideal.)

Preparing for the Lesson

Leaders will:

- Contact the Parks & People Foundation (410-448-5663) for pictures of local community gardens.
- Ask your principal to write a business-style letter to the students asking them for a formal proposal for the vegetable garden. (See Leader Tool)
- Copy the Principal's Letter for each student.
- Have someone from Parks and People come out and provide advice on a few good potential spots for a schoolyard vegetable garden
- Talk to your principal and get his/her approval for which sites are acceptable and can be presented to the children
- Copy the *Planting Guidelines for Cool Weather Crops* for each student
- Between Lesson Sequence Step 9 & 10: Prepare the graphing poster and decide on the scale.

New Vocabulary

Layout

The plan, design or arrangement of something like a garden

Scaled Drawing

A drawing that represents a real object but uses a scale. The scale of the drawing is the ratio of the size of the drawing to the actual size of the object. For example, 1 inch on the drawing may represent 1 yard in the garden plot.

Assessments

- Responses during the garden picture activity
- Garden plans

Lesson Sequence

1. Pass around pictures of community gardens obtained from the Parks and People Foundation and found in Leader Tools. Ask students to notice the beauty of the gardens and the way the plants are arranged or laid out in the garden. Ask if they have any ideas about why the plants were planted in that pattern.

2. Ask the students for their thoughts about what a gardener should consider when planning the placement of plants in a garden. (You're looking for space for growth, sun, public traffic, access to water, etc.)

3. Pass out the principal's letter to each student and read it aloud with the class.

4. Have the class discuss the request and begin talking about garden plans (what to plant, where to put the garden, etc.) Use the Planting and Harvesting Times table at the end of this lesson as a resource.

5. Take the students outside to look over the sites that have been approved by the garden experts from Parks and People and the principal. Depending on the number of classes at your site and the number of children you may need more than one garden site. Measure your garden plot to calculate the area (length x width). This measurement will tell you how much space you have to work with and will help you plan your garden.

6. Back inside, pass out the *Planting Guidelines for Cool Weather Crops* and go over it with the students.

7. Before they begin working on their plans, draw a garden plot on the board and work with the class to fill in one row of a vegetable. Show the required spacing between rows and plants as per the Planting Guidelines. (See Leader Tool). Introduce the use of scaled drawings. (Use your judgment as to whether to have the children develop a scale.)

8. Break students into small groups and have them use the planting guidelines to plan a vegetable garden. Have them lay it out on their graph paper. Remind them to include the required spacing between rows and plants.

9. As groups finish, pass out drawing paper, crayons and markers. Have the children draw pictures of what they think their gardens will look like when the plants have grown and are ready to harvest. They should also draw pictures of themselves eating some of the delicious vegetables that will be grown in the garden.

10. Once the groups have finished, have each group present their garden plan to the class.

11. Reach a consensus on a class garden plan taking into account each small group's ideas.

12. Use the large graphing poster to create a scaled drawing of the garden on the poster. Make sure there is enough space between plants to accommodate growth patterns and room for walking or stepping stones. Keep the poster to use during the actual planting.

Maryland SC Standards (2nd and 3rd Grade): *Standards are presented in the following format:* *(Grade)Standard.Topic.Indicator.Objective – Objective Statement*	
Science	
Standard 1.0 Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.	**Constructing Knowledge** (2)(3)1.A.1.b – Seek information through reading, observation, exploration, and investigations. **Applying Evidence and Reasoning** (2)(3)1.B.1.b – Develop reasonable explanations for observations made, investigations completed, and information gained by sharing ideas and listening to others' ideas. **Communicating Scientific Information** (2)(3)1.C.1.a – Describe things as accurately as possible and compare observations with those of others. (2)(3)1.C.1.c – Draw pictures that correctly portray at least some features of the thing being described and sequence events (seasons, seed growth).
Standard 3.0 Life Science: Students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.	**Ecology** (2)3.F.1.b – Explain that organisms live in habitats that supply their basic needs. • Food • Water • Air • Shelter

Module 6 • Lesson 10 • Plant the Garden

Action Synopsis

Students plant their schoolyard vegetable garden based on the group's garden design plan.

Time

1 – 2 sessions

Desired Outcomes

Students will:

- Demonstrate proper planting techniques.
- Ability to follow group's garden design plan.
- Demonstrate enthusiasm about planting the garden.

What You'll Need

For Whole Class

(Note: the Parks and People Foundation Gardner will provide all supplies necessary for this activity)

□ Purchased seedlings
□ Garden plan (created last lesson)
□ Plant Identification Markers (Stakes with crop name)
□ Laundry pen
□ Trowels (enough for children to comfortably share)
□ Powdered organic fertilizer
□ Empty milk jugs (# depends on how you organize children for planting)
□ Eco-spouts (# depends on number of jugs)
□ Chicken wire or other fencing material (per recommendation of gardener)
□ Mulch (per recommendation of gardener)
□ Garden Maintenance Checklist
□ Optional: Students can use paints and wood pieces to create a sign and labels for their garden

People Power

Try to get help from gardener from Parks and People Foundation or Master Gardeners, 4-H staff, graduate students from the Morgan State University Department of Landscape Architecture, etc.

Preparing for the Lesson

Leaders will:

- Contact the Parks & People Foundation or other gardener groups to get volunteer(s) to help with planting. You may need help preparing the plot prior to the actual planting.
- Plan to get seedlings (as needed)
- Fill the milk jugs with water and attach the eco-spouts
- Loosen the garden bed before you go out with the kids. Simply go out with a trowel and stir up the soil a bit so it is easier to work with. (Depending on your site, you may need to get help with this.)
- Decide on how you will organize the students for the planting (Will you take everyone out together or divide the children into small groups that will go outside and plant assigned crops in a staggered fashion.
- Make the **Garden Maintenance Notebook**: Make several copies of the Garden Maintenance Checklist and punch 3 holes into them. Put them in a binder. (Once the garden is planted the Notebook should be kept in a dedicated spot near the door.)
- **<u>At least three times per week</u>, make sure you take a small group of students outside to work on the garden and complete the tasks on the Garden Maintenance Checklist.**
- You may want to consider using a **Friday Green Day** as an opportunity to tend to the garden.

Assessments

- Behavior during the planting
- Actual garden's adherence to design plan

Lesson Sequence

1. Right before the gardener arrives, ask a few children to think of questions to ask the gardener. Be sure to guide students to ask questions about his/her education, if gardening is his/her job, why he/she chose to be a gardener, what he/she likes about it, what advice he/she has for someone who wants to be a gardener, etc.

2. When the gardener arrives, begin the lesson with the children's questions.

3. Next, have the gardener explain how to plant the seedlings in the garden.

4. Give students jobs to do while outside. If you'd like to, you can have them trade jobs during the planting. Jobs can include: hole digger, seedling placer, hole filler, water manager, fertilizer applier, plant identification marker placer, plan specialist, etc.
5. Take the seedlings, jugs of water, fertilizer and trowels outside. Be sure to have the "plan specialist" bring the garden plan.

6. At the garden begin by pouring the powdered organic fertilizer across the soil and have the students stir it into the soil using the trowels.

7. Plant the garden according to the design plan with the guidance of the gardener. Be sure to insert plant identification markers with the name of each plant

8. After all of the seedlings have been planted, gently spread mulch all over the garden bed. Be careful not to hurt the seedlings.

9. Lightly water the garden. Don't water it too much or you will drown your seedlings.

10. Back inside, have the children share their thoughts, questions, concerns, excitement about the garden.

11. Begin a discussion with the children about caring for the garden. Get their ideas! Then go over the Garden Maintenance Checklist. Congratulate them if their ideas included watering, weeding, and removing trash. Show students the Garden Maintenance Notebook and explain that at least three times per week, small groups of students will take turns caring for the garden and making notes and observations in the Garden Maintenance Notebook.

12. Make thank you notes to send to your Gardener volunteer.

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Module 6: Food, Nutrition and Agriculture

Worksheets and Handouts

Grades 2 and 3

WHAT IS AN ECOSYSTEM?

We've talked about ecosystems, but what is an ecosystem? Ecosystem is a term used by scientists. It describes an area where living things interact with (relate to) each other and their physical environments.

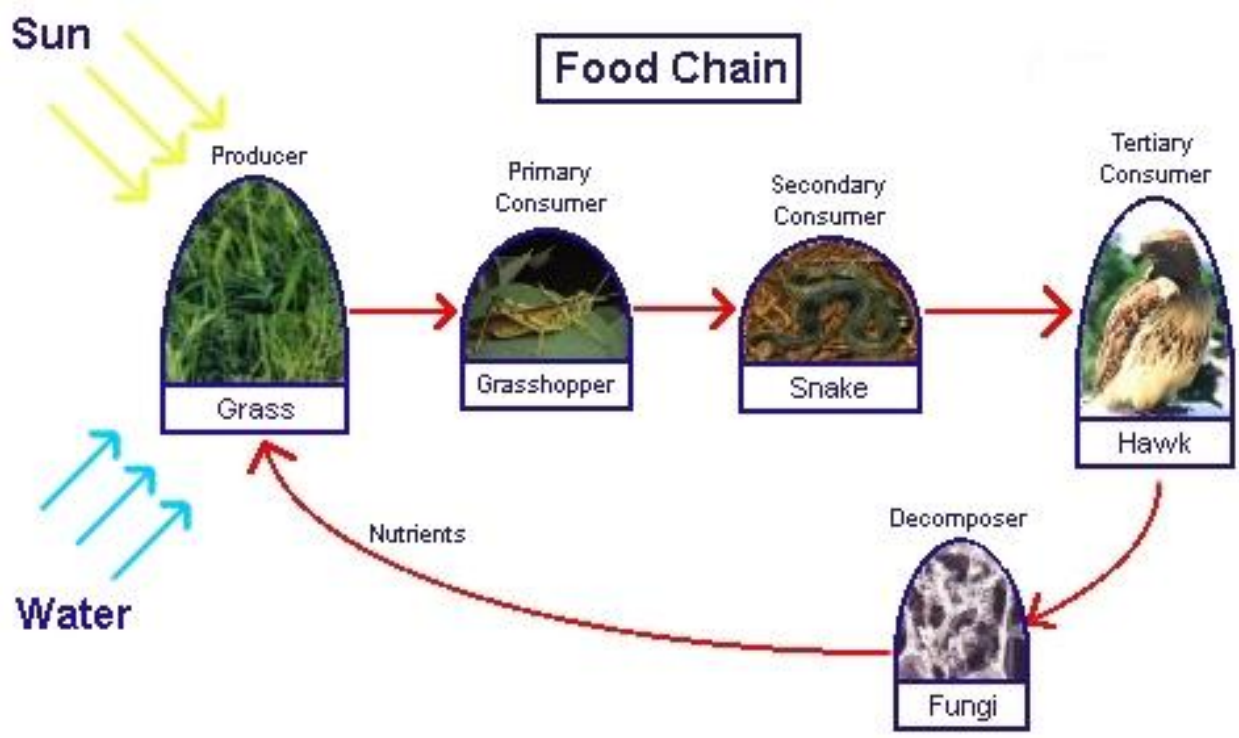
An ecosystem is where things live. When we talk about an ecosystem we mean everything that is in it. That includes <u>all</u> living and non-living things. Ecosystems include plants, animals (including us humans), gases (like oxygen and carbon), soils, bacteria, and fungi.

There are more types of ecosystems in the world than you can imagine. Ecosystems can be very big (like a tropical rainforest) or very small (like a drop of water). Ecosystems can be human-made with clear boundaries (like a garden) or they can be natural (like a desert). Ecosystems interact with the surrounding environment and other ecosystems.

Ecosystems have inputs, which are things that come into the ecosystem. Ecosystems also have outputs, which are things that move out of the ecosystem.

Here's an important example! Energy from the sun gets trapped in plants during photosynthesis. Then plants are eaten by small animals, like rabbits or insects. Both rabbits and plants need gasses (like oxygen and carbon dioxide) to survive. Larger animals, like snakes, eat the rabbits. Snakes will get eaten by hawks. Then eventually the hawks die as well. The bodies of the hawks then become food for very small microbes. The microbes decay (break down) the hawk which releases nutrients. Then the microbes return these nutrients to the soil. Plants then take them up through their roots. In this example, sunlight, water and gases are inputs and food and nutrients are outputs.

Look at the diagram on the next page.
A Food Chain:



http://www.jenningsk12.net/WE/peimann/Science/FoodChains/food_chain.jpe

Name _____ **Date** _____

SCHOOLYARD ECOSYSTEMS

DIRECTIONS: Choose an ecosystem in your schoolyard. Draw a picture of it on the back of this sheet and answer all of the questions below**.**

1. What are the **inputs** to the ecosystem?

_____

_____

_____

2. What are the **outputs** of the ecosystem?

_____

_____

_____

3. What living and non-living things are part of the ecosystem? Include things you can and can not see.

_____

_____

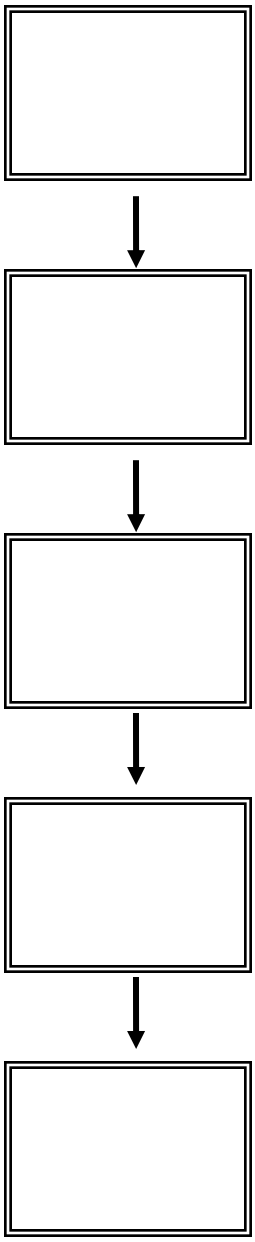
_____

Name: _____ **Date:** _____

YOU in the Food Chain!

Directions: 1. Draw a food chain that includes yourself.

2. Label the sun, producer, consumers, and decomposers in your food chain.



What's In a Food Label?

A **label** gives you information about something. Food labels tell you many things:

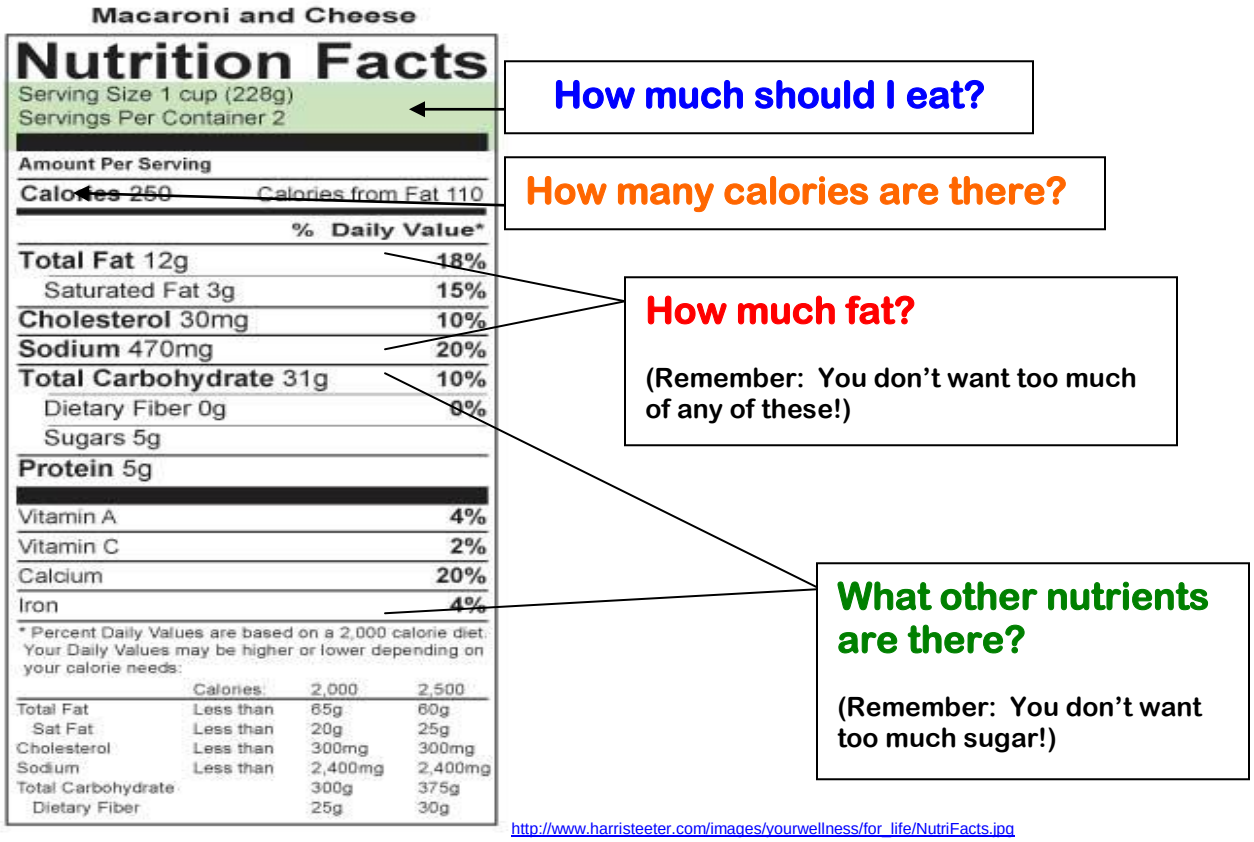
- **How much** you should eat at a time
- **How many calories** you are eating each serving
- **What kinds of nutrients** are in the food you are eating
- **How much of each nutrient** your food has

There are some nutrients that you should get a lot of. Some nutrients should only be eaten once in a while. The food labels on your food helps you make good choices!

How much is too much?

5% or less is **LOW**

20% or more is **HIGH**



http://www.harristeeter.com/images/yourwellness/for_life/NutriFacts.jpg

Food Label Investigation!

Partner Work

Directions: 1. Find the Food Label and Ingredients on your food package.

2. Collect data using the Food Label and Ingredients for your snack food.



---

1. What is your food? _____

2. How many SERVINGS are in your food package? _____

3. DIVIDE your food into serving groups.
(Example: If your serving size is 2, then make 2 equal piles of each.)

How much does each person get? _____

Is that enough for each person? _____

Why or why not? _____

4. How many calories are in each serving? _____

5. What nutrients are in your food? Put a √ by each one that is in your food.

		How many?
Fats	_____	_____%
Carbohydrates	_____	_____%
Protein	_____	_____%
Minerals (Potassium, Calcium, Iron)	_____	_____%
Vitamins (A, B, C, or D)	_____	_____%

6. Look at the ingredients and highlight the words that are familiar to you.

Read them out loud and write them below:

_____

What is the FIRST ingredient of your food? _____

What is the LAST ingredient of your food? _____

Food Comparison!

Group Work

Directions: 1. Use your data to compare the two snack foods.

2. Share your findings with the class.

---

1. Which food has more CALORIES? _____

2. Which food has more FAT? _____

3. Which food has more VITAMINS? _____

4. Which food has more FIBER? _____

5. Which food do you think is HEALTHIER? _____

Why do you think so?

---

6. Which food TASTES better? _____

Why do you think so?

Insert:
Go, Slow, and Whoa Foods Table:
http://www.nhlbi.nih.gov/health/public/heart/obesity/wecan/downloads/go-slow-whoa.pdf

Lesson 6:
GO! SLOW! WHOA! Foods

Name: _____

Directions: 1. Read your Food Diary Journal.

2. Put each food you ate into one group.

Use your teacher and handout for help!

GO!	SLOW!	WHOA!
		

Lesson 6:
GO! SLOW! WHOA! Scavenger Hunt

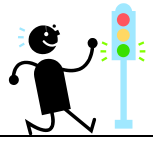
Names: _____

Directions:

1. **Find 4 examples each of GO, SLOW, and WHOA foods and complete the table.**

2. **Answer the questions as a group.**

GO!



Food	Price
1.	
2.	
3.	
4.	

SLOW!

Food	Price
1.	
2.	
3.	
4.	

WHOA!

Food	Price
1.	
2.	
3.	
4.	

Reflection:

1. Which kind of food was the **EASIEST** to find? Circle one.

GO! **SLOW!** **WHOA!**

Why do you think so?

_____

_____

2. Which kind of food was the **HARDEST** to find? Circle one.

GO! **SLOW!** **WHOA!**

Why do you think so?

_____

_____

3. Which kinds of foods were the **MOST** expensive?

GO! **SLOW!** **WHOA!**

Why do you think so?

_____

Get Up and Exercise!

You may not know it, but you exercise all the time. When you run and play games at school you are exercising. When you exercise, you make your heart healthy, and your body strong and flexible. Exercise helps your brain too!

Exercise Makes Your Heart Happy and Muscles Strong. Your heart is a muscle. It works hard, pumping blood every day of your life. Activity that makes you breathe fast and get sweaty is good for your heart. When you have a healthy heart it gets better at bringing oxygen to your whole body – even your BRAIN!

Exercise Makes You Flexible. Can you touch your toes easily without yelling ouch? When you are flexible, you can move your arms and legs without a lot of tightness or pain. Stretching every day will help your body become flexible.

Exercise Helps Your Body Ecosystem. Remember, your body is an ecosystem! Food gives your body calories, which are a kind of energy. Your body needs a certain amount of calories every day just to breathe, walk around, and do all the basic stuff. If you exercise, your body needs more calories or energy. If you do not exercise that much, your body does not need as many calories. If you eat enough calories, your body weight will stay about the same. If you eat more calories than your body needs, it may be stored as fat. When your body has too much fat, it can make you unhealthy.

Exercise Makes You Feel Good. It feels good to have a strong, flexible body that can do all the activities you enjoy — like running, jumping, and playing with your friends. It's also fun to be good at something, like scoring a basket, hitting a home run, or dancing.

Adapted for readability from: "Why Exercise is Cool" at
http://kidshealth.org/kid/stay_healthy/fit/work_it_out.html#

Reviewed by: Mary L. Gavin, MD
Date reviewed: February 2009

Module 6: Food, Nutrition and Agriculture

Journals

Grades 2 and 3

Lesson 3 Journal:

What is a "Food Chain"?

Name: _____

Directions: Think about the term "food chain." What do you think it means?

_____

_____

_____

_____

Drawing:

Lesson 5 Journal:

Is your body an ecosystem?

Name: _____

Directions: Answer the question using what you have learned from the previous activities. Explain WHY you chose your answer.

_____

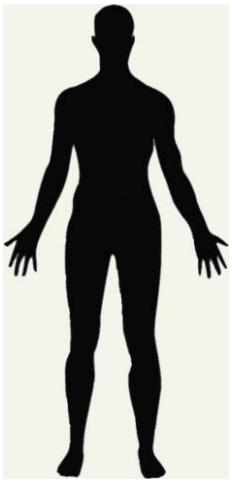
_____

_____

_____

Drawing: Show the inputs and outputs of the human body. If you aren't sure, use your body tracing from the previous activity.

INPUTS **OUTPUTS**



Lesson 6 Journal:

Nutrient Review

Name: _____

Directions: Answer each question using your own ideas from yesterday's activity.

What are nutrients?

_____

_____

What do nutrients do for your body?

_____

_____

Drawing:

Lesson 7 Journal:
Keeping a Food Diary

For today's activity you will need to record the food you have eaten in one day.

Directions: Use your memory and list the foods you ate for each meal listed below. You do not have to remember how much of each food you ate.

Last Night's Dinner:

_____

_____

_____

_____

Today's Breakfast:

_____

_____

_____

_____

Today's Lunch:

_____

_____

_____

_____

Snacks:

_____

_____

Lesson 8 Journal:

What do you do to exercise?

Name: _____

Directions: Answer the question above and illustrate your writing.

_____

_____

_____

_____

_____

_____

Drawing:

Lesson 9 Journal A:

"Takiya and Thunderheart's Life Garden"

Name: _____

Under development:
Make questions/character reflections after book has been ordered and read…

Lesson 9 Journal B:

A Community Garden

Name: _____

Directions: Complete the sentences with your own thoughts about the visit to the garden.

A community garden is _____

_____

The things that are growing in a garden are _____

_____

If you want to start a garden you have to _____

_____

The thing I enjoyed MOST about my visit to the garden was _____

_____

Drawing:

Module 6: Food, Nutrition and Agriculture

Leader Tools

Grades 2 and 3

Insert:
Food Chain ID Slides
Nutrients Slides
Red Light, Green Light Slides
Go, Slow, and Whoa Foods Table:
http://www.nhlbi.nih.gov/health/public/heart/obesity/wecan/downloads/go-slow-whoa.pdf