

# **What a Tangled Web We Weave**

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## **GRADE LEVELS**

3 thru 8

## **TIME ALLOTMENT**

5 – 45 min. class periods.

## **OVERVIEW**

Students will come to understand that in a community, organisms are dependent on the survival of other organisms. Energy is passed from one organism to another. Students will construct food webs and energy pyramids as well as make a foldable. Students will write an informative essay about the food web that they have designed.

## **SUBJECT MATTER**

Science/Language Arts

## **LEARNING OBJECTIVES**

Students will be able to:

- Follow the flow of energy through food webs. Energy is passed from one organism to another.
- Demonstrate that within a community, organisms are dependent on the survival of other organisms.
- Energy resources of a community are shared through the interactions of producers, consumers, and decomposers.
- Populations of one species may compete with populations of other species for resources.
- Students will create a foldable to define and illustrate food chains, food webs, and energy pyramids.
- Students will write an informative essay about the food web they created.

## **STANDARDS**

The objectives listed may be used in part to address the Virginia Standards of Learning at the <http://www.pen.k12.va.us>

Science 3.5

The student will investigate and understand relationships among organisms in aquatic and terrestrial food chains. Key concepts include producer, consumer, and decomposer.

### Science 3.6

The student will investigate and understand that environments support a diversity of plants and animals that share limited resources. Key concepts include population and community.

### Science 4.5

The student will investigate and understand how plants and animals in an ecosystem interact with one another and the nonliving environment. Key concept: include flow of energy through food webs.

### L.S. 6

The student will investigate and understand the basic physical and chemical processes of photosynthesis and its importance to plant and animal life. Key concept: photosynthesis as the foundation of food webs.

### LS.7

The student will investigate and understand that organisms within an ecosystem are dependent on one another. Key concepts include interactions resulting in a flow of energy and matter throughout the system; and energy flow in food chains, food webs, and food pyramids.

### Biology 9a

The student will investigate and understand dynamic equilibria within populations, communities, and ecosystems. Key concept: nutrient cycling and energy flow through ecosystems.

### Writing 8.7

The student will write in an informational form.  
Use prewriting strategies to generate and organize ideas.  
Organize details to elaborate the central idea.  
Select specific vocabulary and information.

### Writing 5.8

The student will write for a variety of purposes: to describe, to inform, to entertain, and to explain.  
Organize information.  
Demonstrate awareness of intended audience.  
Use precise and descriptive vocabulary to create tone and voice.  
Revise writing for clarity.

### Writing 9.6

The student will develop informational writings to inform, explain, analyze, or entertain.  
Generate, gather, and organize ideas for writing.  
Plan and organize writing to address a specific audience and purpose.  
Communicate clearly the purpose of the writing.  
Use specific vocabulary and information.

## MEDIA COMPONENTS

United Streaming Video: *Food Chains and Webs* [www.unitedstreaming.com](http://www.unitedstreaming.com)

Software program: *Inspiration* (Available in most school systems. Anyone can download a free 30 day trail from <http://inspiration.com/freetrial>)

Websites:

- <http://www.msnuceus.org/membership/storybooks/foodchain.html> (cartoon)
- <http://mrsdell.org/foodwebs/> (definitions, rubric)
- [http://www.gould.edu.au/foodwebs/kids\\_web.htm](http://www.gould.edu.au/foodwebs/kids_web.htm) (BrainPops movie)
- <http://www.vtaide.com/png/foodchains.htm> (four food webs)

## MATERIALS

Masking tape

4- 8 1/2 x 11 sheets of paper per student to make foldable

Stapler and staples

Pictures of consumers, producers, and decomposers

Computers and/or SmartBoard

Writing paper to construct an informational essay.

## PREPARATION FOR TEACHERS

- Prior to teaching the unit, bookmark the Web sites. (Follow the acceptable internet use policy for your school.)
  - <http://www.msnuceus.org/membership/storybooks/foodchain.html> (cartoon)
  - <http://mrsdell.org/foodwebs/> (definitions, rubric)
  - [http://www.gould.edu.au/foodwebs/kids\\_web.htm](http://www.gould.edu.au/foodwebs/kids_web.htm) (BrainPops movie)
  - <http://www.vtaide.com/png/foodchains.htm> (four food webs)
- Download the United Streaming video, *Food Chains and Webs* to desktop or CD.
- Download rubric to use to grade food web in the culminating activity
- Cue the video clip to the place that you want to start the lesson.
- Make sure you go through the instructions from the student materials and handouts so that you understand and are familiar with the lesson format and what the students need to do or understand for the lesson.
- Make a foldable using the instructions in the lesson.
- Make certain students are familiar with the following:
  - Students should be familiar with the eight biomes: desert, boreal, deciduous, tundra, grassland, rainforests, marine and freshwater
  - Students should be with familiar with the terms *habitat*, *predator*, *prey* and *community*.

## INTRODUCTORY ACTIVITY: SETTING THE STAGE

Objective: Students are to predict if they have a picture of a *producer*, *consumer* or *decomposer* taped to their back, and then be as specific as possible in naming the actual organism.

1. As students come into class, greet them at the door and tape a picture of a producer (plant), consumer (animal), or decomposer (bacteria), to their back. Do not let them see what you tape to their back.
2. Explain to students that they cannot tell each other what is taped to their back.
3. Each student will have the opportunity to ask another student three questions about the picture that is taped to their back. All questions must be answered with a **YES** or **NO**. (Examples: Does this organism eat plants? Does this organism have wings? etc.)
4. If they are unsuccessful at guessing what is on their back, the students may switch partners and ask three more questions.
5. If unsuccessful, the student may switch partners one more time and ask three more questions.
6. After nine questions, reveal the organism if student has not guessed it by then.
7. Click on <http://www.msncucleus.org/membership/storybooks/foodchain.html> and show video, *The Food Chain*. **Provide a Focus for Media Interaction** by saying: After you watch this short cartoon, I want you to describe the *Cycle of Life*. [Ans. Plants (producers) provide food for animals (consumers). When animals die, their bodies are broken down by decomposers and scavengers and provide nutrients for new plant growth.]

## LEARNING ACTIVITY

1. Cue the video, *Food Chains and Webs* at the point where you see a heron at the bank of a river and the narrator has just said “A heron is a type of consumer or predator that eats animals.(7:50) **Provide a Focus for Media Interaction** by saying, “This video segment is about food. After watching this segment I want you to be able to tell me what a food chain illustrates?” **Play** and **Pause** when you see the words *Food Chain* appear on the screen and the narrator says “...organisms in a specific place” (7:59). **Ask**, “What does a food chain illustrate?” (A food chain illustrates the feeding relationships and transfer of energy between organisms in a specific place.)
2. **Provide a Focus for Media Interaction** by saying, “In this next segment the narrator explains why this illustration is called a food chain. What does he give for a reason?” **Resume** and **Play** video until you see a linked chain and the narrator says “...linked to the other, as in a chain.” (8:06). **Ask**, “Why is this illustration called a food chain?” (Each organism is linked to the other as in a chain.)

3. **Provide a Focus for Media Interaction** by saying, “In this next segment the narrator sums up a food chain. When this video segment is over, I want you to be able to tell me the two groups into which organisms are classified.” **Play** and **Pause** when you see a picture of a food chain and the narrator says, “...with the other organisms being consumers.” (8:32) **Ask**, “What are the two ways that organisms are classified?” (Producers and Consumers)
4. **Provide a Focus for Media Interaction** by saying, “In this next segment, you will see what each level in a food chain is called and what it means.” **Play** and **Pause** when you see the food chain again and the narrator says, “...first, second, third and fourth trophic level. (8:48) **Ask**, “What is each level in a food chain called and what does it mean? (Trophic level. *Trophic* comes from the Greek word *trophikos* for nourishment or food.)
5. **Provide a Focus for Media Interaction** by saying, “Now watch for what the narrator says happens when one organism eats another organism.” **Play** and **Pause** when you see the food chain again with the words *Decreasing Energy* written across screen and you hear “...demonstrates the transfer of energy.” (9:13) **Ask**, “What happens when one organism eats another organism?” (Matter is transferred. The matter or mass of an organism is eaten by the next organism.)
6. **Provide a Focus for Media Interaction** by saying, “After watching this next clip, be able to explain why food chains rarely exist in nature as an isolated single chain?” **Play** and **Pause** when you see a crow on the ground and you hear, “...eat more than just one kind of food.” (9:25) **Ask**, “Why do food chains rarely exist in nature as an isolated single chain?” (Many animals in an ecosystem, like crows, eat more than just one kind of food.)
7. **Provide a Focus for Media Interaction** by saying, “The narrator gives a more realistic representation of what actually occurs in nature when it comes to food chains. When this segment is over, be able to tell me what he says.” **Fast Forward** until you see a black bear. (9:42) **Play** and **Pause** until you see a green food web and you hear, “...and represents many intermeshed food chains.” (10:41) **Ask**, “What is a more realistic representation of what actually occurs in nature when it comes to food chains?” (A food web is a more realistic representation and represents many intermeshed food chains. Animals usually eat more than just one kind of food.)
8. **Provide a Focus for Media Interaction** by saying, “After this next segment be able to tell me the types of decomposers and what they do.” **Play** and **Pause** when you see a person turning a molded piece of bread and you hear “...as is this mold on this piece of bread.” (11:01) **Ask**, “What are the types of decomposers and what do they do?” (Fungi, worms, bacteria, molds and any creature which helps break down dead organisms.)
9. **Provide a Focus for Media Interaction** by saying, “Be able to tell me what the narrator says is passed on besides nutrients in this process?” **Fast Forward** until you see some cows eating hay (11:43). **Play** and **Pause** when you see a blue food chain and you hear “...a great deal of it is lost or given off in the form of heat.” (12:04) **Ask**, “What is passed on besides nutrients in this process?” (Energy or food)

10. **Provide a Focus for Media Interaction** by saying, “In the previous clip the narrator states that a great deal of energy is lost in the form of heat. How much heat do you think is lost?” (Take all answers based on 100%) **Say**, “Let’s see who is right.” **Play** and **Pause** when you hear “...as is seen along this food chain.” The blue food web will remain on the screen. (12:14) **Ask**, “How much heat is lost?” (Nearly 90%)
11. Provide a **Focus for Media Interaction** by saying, “In this last clip the energy that is lost can be illustrated. Watch this clip and be able to explain how it can be illustrated and what it compares.” **Play** and **Stop** when you see a food pyramid on the screen and you hear “...less energy is available at the top of the pyramid.” (12:40) **Ask**, “How can the energy that is lost be illustrated?” (In an energy pyramid. An energy pyramid compares the energy available at each level of the food chain)

### **Culminating Activity: Website Activity**

#### 1. Pre-Website Activity

- Give students four sheets of colored paper. **Say**, “Students, you are going to construct a foldable to record specific information on as you visit certain websites today.” (If you are going to do this activity in the classroom with an LCD projector, adjust the student directions as needed.)
- Refer to “Foldable Directions” at the end of this lesson.
- After foldable is made and labeled, proceed with the website instructions for student and teacher that is included in this lesson. (attached)

#### 2. Website Activity

- **Say**, “Today students we will be working on four different websites(adjust directions according to whether you are working in computer lab or with the SmartBoard- see directions that are included at end of this lesson). I am going to give each one of you directions to use to work through the websites.” Give out “Website Directions- Student” (attached).
- As students are working, walk around the room and check for understanding.

3. Give students a copy of the *Rubric* that you printed out earlier from website at <http://mrsdell.org/foodwebs/> before they begin to design a food web on their foldable. Using foldable, have students choose a Biome that will serve as inspiration to illustrate a food chain, food web and energy (food) pyramid on the appropriate flaps.

4. Using the *Writing to Inform Rubric*, have students write an informative essay about the food web they created on their foldable. This activity could be a cross-curricular activity with the English teacher assisting students with the writing process including revision, editing and producing the final product.

## **CROSS-CURRICULAR EXTENSIONS**

### Science:

- Have students prepare a list of everything they ate yesterday on a sheet of paper and break down the food into its basic components (plant: wheat, broccoli, etc; animal or animal products such as chocolate milk or fruit yogurt).
- Construct food chain for specific organisms, examples: birds of prey, song birds, aquatic birds, etc
- Review the threatened and endangered species list.

### Art:

- Present food chains, food webs using pictures instead of words
- Decoupage a cube with animals in a particular biome.

### Math:

- Find out how much food is exported and imported into the USA
- Predict the effect of population changes on the food web of a community.

### Social Science:

- Design a map that shows where the major food crops of the world are grown.
- Examine the flora and fauna of certain regions.

### Language Arts:

- Write a 2 to 3 page paper about what might happen to the world's economy if a major food source (producer or a consumer) would become depleted.
- Write a paper based on a disease or toxin that could be passed along in the food chain/web. Example: mad cow disease

### **Community Connections:**

- Wildlife specialist could visit the school and talk to students about local plants and specific wildlife that depend on them for survival.
- Nutritionists could demonstrate a breakdown of favorite foods of the class.
- National Forest Service representative could talk about how fires can help and harm various populations of plants and animals.
- Invite Game and Inland Fisheries to elaborate on the effects of pollution on the human chain.

## Writing to Inform Rubric

Score	Content
4	<p>Your paper is well developed and you have more than enough information to inform the reader about the topic. The information is clearly presented with lots of elaboration.</p> <p>You have a clear organization and you don't stray from it.</p> <p>You write for the intended audience.</p> <p>You frequently use language choices to maintain a style or a tone.</p>
3	<p>Your paper is fairly well developed and you have enough information to inform the reader about the topic. The information is clearly presented with some elaboration.</p> <p>There are some specific details that adequately explain the topic but some of the details may not really help explain.</p> <p>You have an organization and you try to stick to it.</p> <p>You wrote for the intended audience.</p> <p>You use language choices to maintain a style or a tone.</p>
2	<p>Your paper has little development and a minimum amount of information. The information does not clearly explain the topic and some of it might even interfere with the explanation.</p> <p>You used details but they may be the wrong details or they may not help to explain the topic.</p> <p>You wrote for the intended audience.</p> <p>You did not really make any language choices to help with style or tone.</p>
1	<p>You created the food web and tried to write a essay.</p> <p>You wrote very little and what you wrote is confusing or inaccurate.</p> <p>The details are not enough to explain the topic.</p> <p>The organization is not clear and you strayed far from it.</p> <p>You did not address the intended audience.</p> <p>You did not use any language choices to help with style or tone.</p>

## Website Directions Teacher

**Note:** Bookmark websites on <http://portaportal.com> for easy access. (If you are not already a member, this is a free website that bookmarks your favorite websites. You may access them from any computer that is connected to the internet.)

### **First Website Directions** (Using SmartBoard or individual computers)

1. Access website <http://mrsdell.org/foodwebs/>
2. Using your foldable access the vocabulary words you wrote down on your foldable.
3. Copy the definition onto the foldable under the flaps at the top, leaving room to illustrate the definition.
  - Producer: Organisms that make their own food
  - Primary consumer: An animal that eats grass and other green plants in a food chain; an herbivore.
  - Secondary consumer: An animal that feeds on smaller plant-eating animals in a food chain.
  - Food web: Shows the interactions among many different food chains in a single ecosystem
  - Food chain: The ways in which the organisms in an ecosystem interact with one another according to what they eat
  - Energy (food) pyramid: Scroll to the bottom of page and click on *Food Chains and Webs*. Scroll down to the definitions of *food pyramid*.  
Energy (food) pyramid: A food pyramid is a model that demonstrates how much energy is needed to sustain a particular living thing.
4. Click on the back button to return to the previous screen.

### **Second Website Directions** (Using SmartBoard or individual computers)

1. Access website [http://www.gould.edu.au/foodwebs/kids\\_web.htm](http://www.gould.edu.au/foodwebs/kids_web.htm)
2. Rotate among several students as they work through the 4 food webs: Australian Grasslands Food web, African Grasslands Food web, Antarctic Food web, Marine Food web. (Note: Point out to students that the food webs appear in the form of an energy pyramid.)
3. Click on the picture at the top right and click and drag the picture into the appropriate box.
4. If in a computer lab, have each student complete all 4 food webs, and signal teacher as they complete each one.
5. Use the back button to go back to the previous screen.

### **Third Website Directions** (Using SmartBoard or individual computers)

1. Access website <http://www.vtaide.com/png/foodchains.htm>
2. Scroll down to very bottom of page and click on *Food Chain Movie*. This will link you to *BrainPops Food Chain*.

3. Take quiz first, play movie, take quiz again.
4. After the movie and quiz go back to homepage and read the entire page.
5. Click on *creating a possible food web* at bottom of page..
6. Read directions. Each student can create a food web and print it out if in a computer lab. If doing activity on SmartBoard, have several students participate and print one master copy.
7. Print one master food web for the entire class.

## Website Directions Student

### **First Website Directions** (Using SmartBoard or individual computers)

1. Access website <http://mrsdell.org/foodwebs/>
2. Using your foldable, access the vocabulary words you wrote down on your foldable.
3. Copy the definition onto the foldable on the appropriate flaps. Leave enough room on foldable to illustrate the definition. (Producer, primary consumer, secondary consumer, food web, food chain, energy pyramid) **Note-** for Energy (food) pyramid: Scroll to the bottom of page and click on *Food Chains and Webs*. Scroll down to the definitions of *food pyramid*.)

### **Second Website Directions** (Using SmartBoard or individual computers)

1. Access website [http://www.gould.edu.au/foodwebs/kids\\_web.htm](http://www.gould.edu.au/foodwebs/kids_web.htm)
2. If using Smartboard, several students will work at board to complete the 4 food webs: Australian Grasslands Food Web, African Grasslands Food Web, Antarctic Food Web, and Marine Food Web. (Note: The food webs appear in the form of an energy pyramid.)
3. If you are in a computer lab, each student is to work through the 4 energy pyramids and signal teacher as you have completed each one.

### **Third Website Directions** (Using SmartBoard or individual computers)

1. Access website <http://www.vtaide.com/png/foodchains.htm>
2. Scroll down to very bottom of page and click on *Food Chain Movie*. This will link you to *BrainPops Food Chain*.
3. Take quiz first, play movie, take quiz again.
4. After the movie and quiz go back to homepage and read the entire page.
5. Click on *creating a possible food web* at bottom of page.
6. Read directions. Create your own food web.
7. Print out if in a computer lab.
8. If doing activity on SmartBoard, several students will participate and create one master copy for the entire class.