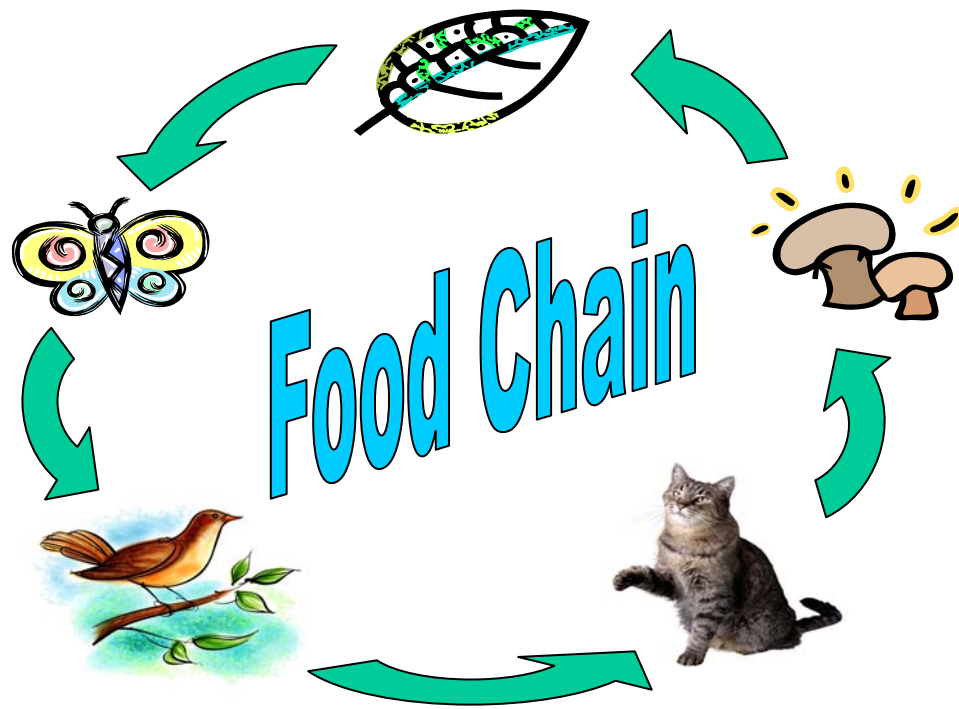




by
The Food Chain Gang

The Food Chain Instruction Plan

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Introduction

The goal of this elementary-level unit is that the student will understand the food chain. The unit functions as part of the broader fourth grade study of ecosystems in which the students have constructed an 'eco-column'. This allows them to observe a live ecosystem and, consequently, a food chain in action. The broader ecosystem study has already established prerequisite student knowledge and skills and provides common background knowledge for students at all socio-economic status levels. The students understand animal eating patterns, the importance of the sun to produce food, and the process of photosynthesis. The unit involves research on an electronic database. Students know how to conduct a keyword search and navigate the database to retrieve relevant articles.

The instructional sequence guides students from an understanding of food chain terminology to the independent creation of a food chain. The unit begins with a video introduction to the concept of the food chain and basic terminology. Students then actively participate in a whole-group discussion to classify various organisms as producers, consumers, or decomposers. On Day Two a research activity allows students to apply search strategies and further define the term 'consumer' as herbivore, carnivore, or omnivore. The function of each organism within a food chain is explored through a simulation game on Day Three, as the students role-play consumers, producers, and decomposers. An interactive, online activity demonstrates the inter-dependence of organisms in a food chain on Day Four. To conclude the unit, students independently create a model of a food chain. Each lesson requires a sixty minute class period.

The unit includes a variety of instructional strategies and student groupings to motivate and engage the student and to teach to different learning styles. Lessons require active student participation, which benefits the kinesthetic learner and students with attentional disorders. Direct instruction is used in combination with student participation to view the introductory video, classify organisms, and review the simulation game. The simulation game requires student role-play of organisms. Use of the computer for the online activity and research is highly motivational for elementary students and enables students to view a direct cause and effect relationship among organisms in the food chain. Finally, the collaborative pairing for database research provides a scaffolding opportunity to support learning.

The unit is highly adaptable to lower income areas with minimal technology access. The lessons on Days Three and Four include both mediated and non-mediated instructional strategies; students can also apply search strategies using print resources for their research on Day Two. The teacher may demonstrate the collaborative online activities as a whole class activity with equal effectiveness. The selected media are designed to reach both auditory and visual learners and accommodate the non-English speaking student. The videos and computer simulations are close-captioned to support visual learners. All of the terminology and concepts are introduced with visual graphics and text. This enables the students to associate the graphic and the text and provides a visual cue for non-English learners.

The instructional designers encourage collaboration with a library media specialist for maximum student success with the food chain unit. Information

Literacy Standards for Student Learning (ILSSL) are integrated with the content and electronic media are used in three of the five lessons. The instructional strategies and research activity in the unit emphasize the importance of an information literate student who “contributes positively to the learning community” and “participates effectively in groups to pursue and generate information.” (Standard 9) The media specialist can instruct and assess the database research and facilitate collaboration. Specifically, the media specialist can provide access to an appropriate database, determine search terms, select relevant articles, take notes, and synthesize the research. The media specialist can assist the teacher in supervising the online computer activity on Day Four and reinforce technology skills as well.

The final assessment uses objective measures, constructed response, and problem solving to evaluate student achievement on the unit objectives and the ILSSL. Matching and grouping exercises assess the student’s understanding of the terminology and classification schemes. Constructed response questions assess the student’s ability to determine the function of each organism in a food chain and the effect on the entire food chain of a disturbance at one level. The concluding problem solving measure requires the student to apply keyword search strategies to research sea organisms and create a food chain based on their findings. ILSSL are also assessed throughout instruction using direct observation. On Day Three the teacher and media specialist will directly observe students’ database research to determine the success of their search strategies in locating information. Direct observation will also be used to assess the students’ collaborative efforts during the

online activities. The final assessment will require a ninety minute period and access to an online database for each student.

The instructional package provides all print, visual, and craft materials necessary to teach the unit. The teacher will provide computer and Internet access and ensure that all electronic connections are operational before each lesson. The teacher will also secure access to a computer lab for the database research on Day Two and the online activity on Day Four. Advanced preparation is necessary on Day Three to successfully implement the simulation game. A complete listing of materials is included with the design

Materials

Provided by teacher:

- Appropriate connector cables
 - Computer to TV
 - Computer to LCD projector
- Computer
 - Teacher computer
 - Student computers – sufficient number for class size and groupings
- External speakers
- Internet access
- Internet access to <http://www.brainpop.com/>
- LCD projector
- Magnetic white board
- Magnetic black board
- Overhead projector
- Projection screen
- Television, large screen

Provided in instructional unit:

- Masters of all unit worksheets, answer keys, overhead transparencies, discussion charts, exit cards, and final assessment
- Cards labeled sun, plant, insect, toad, snake, hawk
- Cards with magnets on their backs to place on board:
 - 5 large cards labeled sun, food chain, producer, consumer, decomposer
 - 4 large definition cards for food chain, producer, consumer, decomposer
 - 24 medium plant/animal organism cards
 - 3 pictures each of herbivores, carnivores, omnivores
 - 3 large cards labeled herbivore, carnivore, omnivore
 - 3 large definition cards for herbivore, carnivore, omnivore
- CD of *Food Chain Mystery* video
- Colored pencils, four packages of twelve
- Construction paper, one package of 500 sheets (including 100 green sheets)
- Food Chain chart
- Hole punchers, 10
- Markers, two packages of six
- Picture of food chain mobile
- Safety pins, box of 100
- Scissors, 10
- Signs for Lesson Three simulation game
 - 16 grasshoppers
 - 6 shrews
 - 3 hawks

String, two 50-yard rolls

The Otters' Story by Joseph Bruchac

200 pieces of green paper (approximately 1x1 inch squares)

Yarn

Ziploc bags, 50

Learner Analysis

I. Cognitive Characteristics

a. Developmental level –

Piaget: Concrete operational stage

Beginning to understand cause-effect relationships with concrete object

Logical thought and problem solving

Children are capable of simple logical operations.

When dealing with known objects and situations, a child can develop concepts, discover relationships, and solve problems.

Co-ordination of multiple dimensions

Children are not yet able to think abstractly.

Seriation: able to arrange objects in a logical progression

Transitivity: based on their knowledge between multiple objects, they able to infer the relationship between two objects.

Class inclusion: able to think simultaneously about an entire class of objects and the relationships among its subordinate classes

b. Reading Level

1. 50% on grade level; 25% above and 25% below

2. Lowest reading level is 2nd grade

c. Level of visual literacy

1. Beginning to assimilate information from pictures and charts

2. Can not assimilate information from graphs

d. Cognitive processing styles

1. Students a combination of visual and kinesthetic learners

2. Require visual cues and physical interaction to process information
ADHD and non-English speaking students especially benefit from visual cues and interaction

e. Cognitive and learning strategies

Vigotsky: active role of learners

Zone of proximal development – concept of readiness; build on prior knowledge

Benefit from scaffolded, cooperative, and inquiry-based learning

Children learn by doing Cooperative projects stimulate learning and build community of learners

f. Specific prior knowledge

1. The food chain unit is taught within the broader context of the fourth grade ecosystems curriculum. As part of the larger study, the class has constructed a mini-ecosystem (the ecocolumn), which allows students to observe both an aquatic and terrestrial food chain.
2. Students understand:
 - (a) Animal eating patterns
 - (b) Importance of sun to produce food
 - (c) Photosynthesis
 - (d) Basic keyword search strategy
 - (e) Database navigation
3. No prior knowledge of food chains or webs

II. Physiological Characteristics

a. Sensory perception

No issues

b. General health

One student is ADHD

c. Age

1. 4th grade
2. 9 and 10 years old

III. Affective Characteristics

a. Motivations to learn

1. External – Parental interest and involvement in the student's school work
2. Internal – natural inquisitiveness and curiosity

b. Attitude toward subject matter

1. Interested in science and animals
2. Erickson – like to physically build things

c. Attitude toward learning

Erickson - Enjoy learning and school

d. Perceptions of and experience with specific forms of mediation

1. Comfortable with computer use
2. Familiar with interactive games
3. Computer use is motivational

e. Academic self-concept

1. Erickson - children start perceiving themselves as successful or a failure.
2. Ruble, Eisenberg, and Higgins – children use social comparison to evaluate and judge their academic abilities

IV. Social Characteristics

a. Relationships to peers

Piaget - Decrease in egocentrism
Flexible and decentered
Social world expands to include more peers
Able to understand different perspectives

b. Feelings toward authority

1. Erickson - industry versus inferiority stage.
The influence of parents is decreasing while that of teachers and peers is increasing.
2. Respect and respond to authority

c. Tendencies toward cooperation or competition

Piaget: Autonomous morality
Able to work cooperatively
Able to consciously use and follow rules

d. Moral development

1. Kohlberg: Conventional level of morality
 - (a) Cooperation with peers
 - (b) Consider the needs of others when making decisions
2. Hoffman: Parental involvement promotes moral behavior in children

e. Socioeconomic background

1. Majority affluent, upper- middle class
Slavin: More academically prepared for school
Parental expectations for achievement are high
Varied extra-curricular experiences enhance background knowledge
Home Internet and computer access
2. Suburban area – aware of nature and animals
3. One F.A.R.M.'s student
Slavin: Lower-income student less academically prepared for school
Lose academic achievement over the summer
Less academic stimulation and exposure to learning resources at home

f. Racial/ethnic background

1. Majority of students Caucasian, 77%
2. New Asian student, non-English speaking
3. Two bi-lingual Asian students
Slavin: Culturally, Asian home environment stresses academics and deference to authority.

Slavin, R.E. (2003). *Educational Psychology Theory and Practice* (7th ed.). Boston: Allyn and Bacon.

Goal and Objectives

Goal: The student will understand the food chain.

Objective 1:

The student will recognize definitions related to the food chain.

Objective 2:

The student will classify organisms by their roles in the food chain.

Objective 3:

The student will apply database search strategies to find examples of consumers.

Objective 4:

The student will organize a list of organisms into a food chain diagram.

Objective 5:

The student will predict how an event at one level of the food chain will impact the entire chain.

Objective 6:

The student will construct a food chain.

Content-Performance Matrix

Content		Performance					
Objective #	Content	Remember	Understand	Apply	Analyze	Evaluate	Create
1	The student will recognize definitions related to the food chain.	X					
2	The student will classify organisms by their roles in the food chain.		X				
3	The student will apply database search strategies to find examples of consumers.			X			
4	The student will organize a list of organisms into a food chain diagram.				X		
5	The student will predict how an event at one level of the food chain will impact the entire chain.					X	
6	The student will construct a food chain.						X

Content-Strategies-Evaluation Matrix

Content		Strategies		Evaluation
Objective #	Content	Presentation/Pattern	Practice/Pattern	
1	Food chain definitions	Large group; video and discussion	Large group board work placing terms and definitions into food chain framework Homework filling terms in the definition blank	Matching of food chain terms and definitions
2	Classify organisms by their role in food chain	Included in video for Objective #1	Large group board work placing organisms into food chain framework Worksheet identifying organism roles by boxing/circling/Xing to distinguish them	Categorizing organisms into proper role classification
3	Apply database search strategies to find examples of consumers	Large group; video and discussion	Large group board practice placing definitions under terms. Partners for applying database search strategies	Perform database search strategies to find examples of consumers.

Content		Strategies		Evaluation
Objective #	Content	Presentation/Pattern	Practice/Pattern	
4	Place organisms into a food chain.	Large group: simulation and discussion	Large group simulation game where students act out the food chain Class discussion	Put given organism into a food chain diagram
5	Predict how event at one level impacts the entire food chain.	Large group; picture book and discussion	Online interactive activity in pairs; homework predicting effect of change at one level on an entire food chain	Accurately describing the effect of a change at one level of a food chain
6	Create a food chain.	Large group discussion/brainstorming Individual work creating mobile	Large group class discussion to brainstorm ecosystems Individual work to identify organism in ecosystems and create a food chain mobile	Students will draw and label food chain

ILSSL Matrix

Content	ILSSL		Performance	
Objective	Standard	Indicator	Practice	Evaluation
#2. The student will classify organisms by their roles in the food chain.	#3 The student who is information literate uses information accurately and creatively	#2 Integrates new information into one's own knowledge	Class board activity placing organisms in correct classifications.	Assessment requiring student to separate listed organisms into proper classifications.
#3. The student will apply database search strategies to find examples of consumers.	#1 The student who is information literate accesses information efficiently and effectively.	#5 Develops and uses successful strategies for locating information	Partner activity searching database for examples of land consumers.	Assessment requires student to locate examples of sea consumers.
#3 The student will apply database search strategies to find examples of consumers.	#9 The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information.	#1 Shares knowledge and information with others	Class discussion of search strategies and results	Media specialist and teacher will observe students during research process.

Content	ILSSL		Performance	
Objective	Standard	Indicator	Practice	Evaluation
#3 The student will apply database search strategies to find examples of consumers.	#9 The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information.	#3 Collaborates with others, both in person and through technologies, to identify information problems and to seek their solutions	Partner activity searching database for examples of consumers.	Media specialist and teacher will observe interactions between students during research process.
#5 The student will predict how an event at one level of the food chain will impact the entire chain.	#9 The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information.	#3 Collaborates with others, both in person and through technologies, to identify information problems and to seek their solutions	Paired online activity followed by large group discussion	Observed cooperative activity; participation in follow-up discussion

Lesson Plans

Day 1 Lesson Plan

Objective:

1. The student will recognize definitions related to the food chain.
2. The student will classify organisms by their roles in the food chain.

ILSSL and indicator:

Standard 3, Indicator 2: The student who is information literate uses information accurately and creatively. Integrates new information into one's own knowledge

Materials needed:

Provided by teacher:

1. Television or LCD projector with necessary cables to computer
2. Projection screen, if LCD is used
3. Computer to play video from CD
4. A copy of Worksheet 1-A for each student
5. A copy of Worksheet 1-B for each student
6. Magnetic black board, chalk

Provided in instructional unit:

1. United Streaming video –
Food Chain Mystery, The. 100% Educational Videos (2000). Retrieved October 30, 2005, from unitedstreaming:
<http://www.unitedstreaming.com>
2. Placards with magnets on their backs to place on board

5 large cards labeled sun, food chain, producer, consumer, decomposer

4 large definition cards for food chain, producer, consumer, decomposer

24 medium plant/animal organism cards

3. Worksheet 1-A
4. Worksheet 1-A, answer key
5. Worksheet 1-B
6. Worksheet 1-B, answer key

Presentation and practice formats:

1. Large group presentation for the video
2. Large group presentation for the board activity
3. Individual work on worksheets

Accommodations:

1. Where possible, graphics are used in addition to text.
2. Bi-lingual students will act as interpreters for non-English speaking student.
3. ADHD student will be asked to assist at the board more than once.

Type of Instructional Activity	Teacher's Role	Time
Motivation	a) Remind students of how their study of ecosystems has shown that organisms interact and are dependent on their environment. b) Tell students that not only are organisms dependent on their environments, but they are dependent on each other for food for survival and we are going to investigate this dependence.	2 minutes
Objective	Tell students that after we study this unit, they will know the definitions of food chain terms and will classify organisms by their roles in the food chain.	
Prerequisites	Review the role of the sun in making plants grow and giving them stored energy.	5 minutes
Information and examples	Play <i>The Food Chain Mystery</i> video.	15 minutes
	Board Activity a) Place Food Chain and Sun card at top of board in that order. b) Place Consumer, Producer, and Decomposer cards on board in random order. c) Ask student to come to board and put cards in food chain order under the sun. Draw arrow from decomposer back to producer. d) Hand Food Chain, Consumer, Producer, & Decomposer definition cards to four students. Ask them to place them under the correct term. Remind students that these, in addition to the sun, are the components of a food chain. e) Pass out organism cards to students. Ask them to individually place their organism under the term and definition to which it belongs. Give non-English speaking student a plant card to enable a pictorial matching to producer. f) Leave all above on board during practice activity (Worksheet 1-A).	20 minutes

Type of Instructional Activity	Teacher's Role	Time
Practice and feedback	a) Pass out Worksheet 1-A to students b) Review an example of each class - Producer, Decomposer, and Consumer c) Students complete worksheet in class. Bi-lingual students should assist non-English speaking student. d) Collect worksheet. e) Review prior to Day 2 for evaluation of student understanding.	10 minutes
Additional examples		
Additional practice and feedback	Pass out Worksheet 1-B to students to complete as homework.	
Summary	Tell students that today they learned the basic elements of a food chain (sun, producer, consumer, decomposer), the definitions of the elements (use definitions that are on the placards on the board), and how to classify organisms into those elements.	

Food Chain Worksheet 1-A

Name _____

Date _____

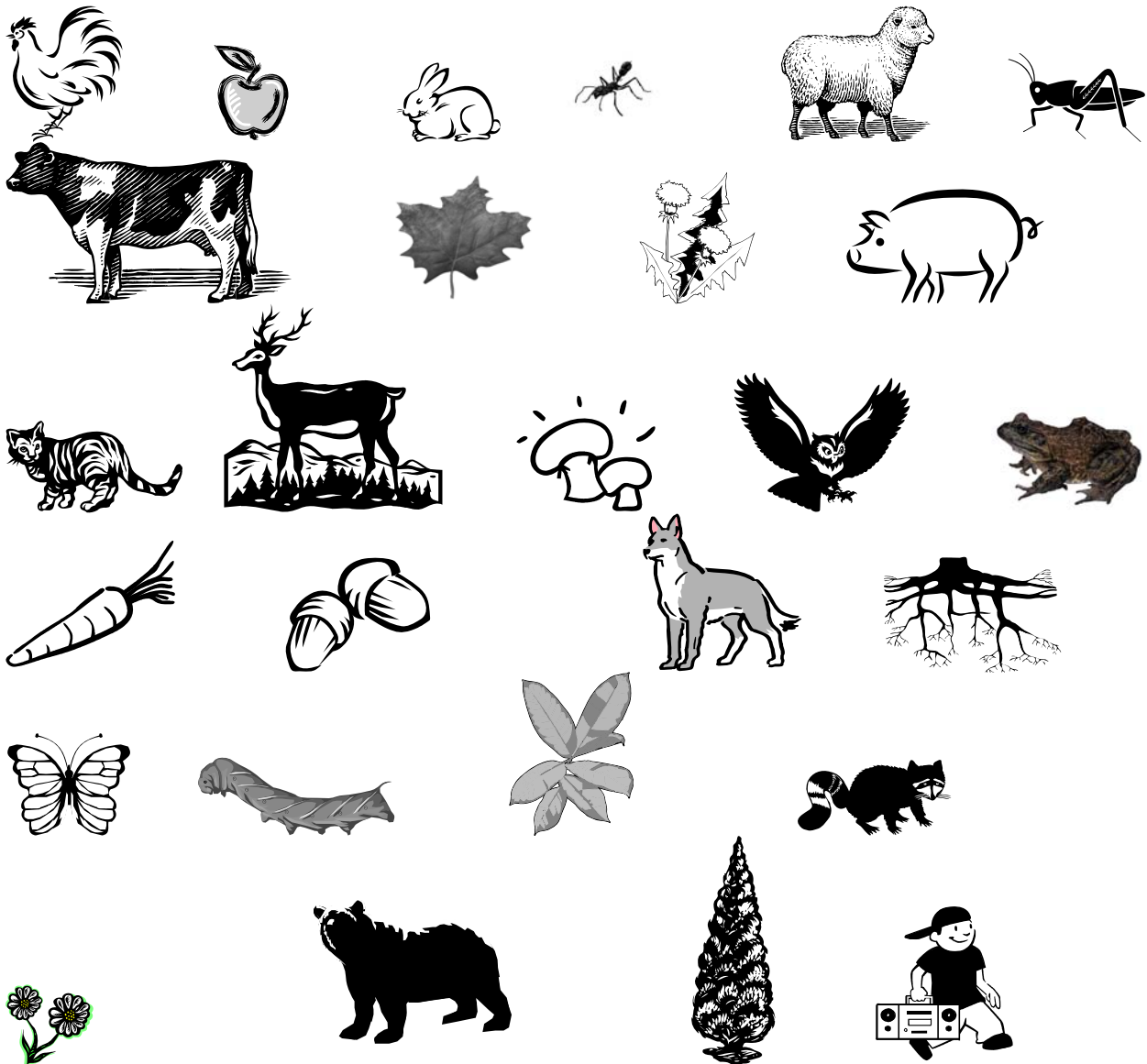
Draw a picture of the source of energy for the Producers.

Circle the Producers

X the Decomposers

Box the Consumers

Draw here!



Food Chain Worksheet 1-B

Name_____

Date_____

In class today, we discussed the **definitions** of terms related to a **food chain**.

Food chain – Series of steps by which energy is obtained, used, and changed by living things. Example – sunlight helps grain to grow, the grain feeds cattle, and humans eat the cattle

Producer – Organism that takes non-living matter (energy from the sun, water, minerals, carbon dioxide) and uses it to produce food (energy) for itself with surplus for other organisms. Example – plants

Consumer – Does not produce own food. Example – animals

Decomposer – Organism which feeds off dead plants and animals and reduces their remains to minerals and gases again. Examples – worms, bacteria

Read the above definitions, then fill in the blanks.

(Beware! One term is used twice as an answer!)

1. The first link in a food chain, which uses non-living matter to produce food (energy), is called a _____.
2. _____ feed off dead plants and animals.
3. The sequence of events where food (energy) is passed from one organism to another is called a _____.
4. A _____ is the process by which energy is obtained, used, and changed by organisms.
5. An organism that does not produce its own food is a _____.

Food Chain Worksheet 1-A, answer key

Name _____

Date _____

Draw a picture of the source of energy for the Producers.

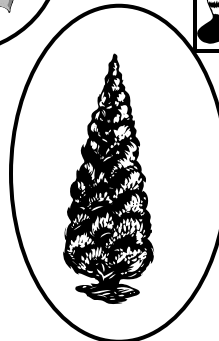
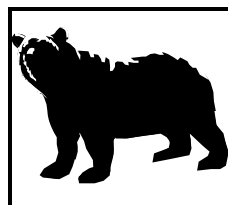
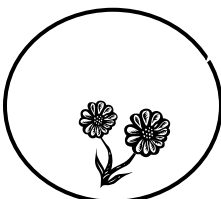
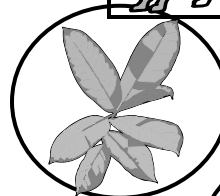
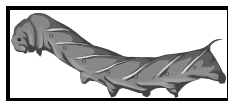
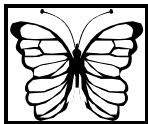
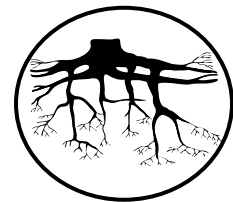
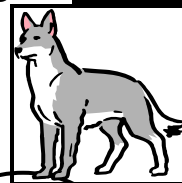
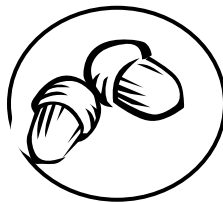
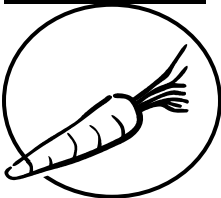
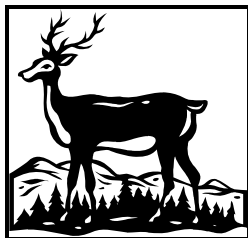
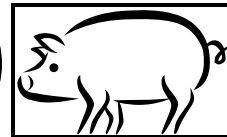
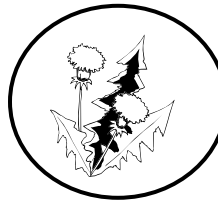
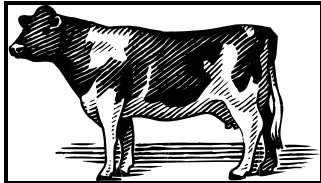
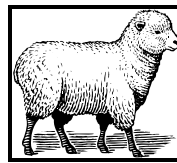
Circle the Producers

X the Decomposers

Box the Consumers

Draw here!

A drawing of the sun.



Food Chain Worksheet 1-B, answer key

Name _____

Date _____

In class today, we discussed the **definitions** of terms related to a **food chain**.

Food chain – Series of steps by which energy is obtained, used, and changed by living things. Example –sunlight helps grain to grow, the grain feeds cattle, and humans eat the cattle.

Producer – Organism that takes non-living matter (energy from the sun, water, minerals, carbon dioxide) and uses it to produce food (energy) for itself with surplus for other organisms. Example – plants

Consumer – Does not produce own food. Example – animals

Decomposer – Organism which feeds off dead plants and animals and reduces their remains to minerals and gases again. Examples – worms, bacteria

Read the above definitions, then fill in the blanks.

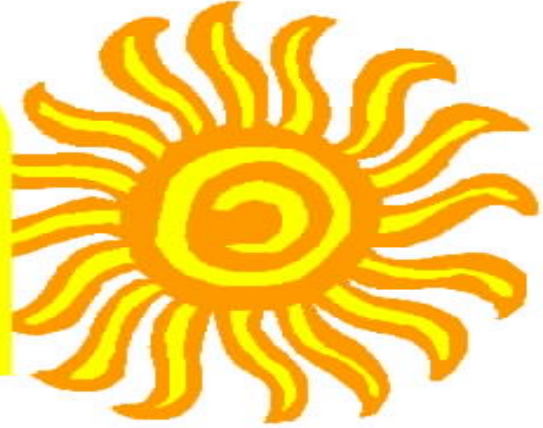
(Beware! One term is used twice as an answer!)

6. The first link in a food chain, which uses non-living matter to produce food (energy), is called a producer.
7. Decomposer feed off dead plants and animals.
8. The sequence of events where food (energy) is passed from one organism to another is called a food chain.
9. A food chain is the process by which energy is obtained, used, and changed by organisms.

An organism that does not produce its own food is a consumer.

Food Chain Term and Definition Placards 1

sun



decomposer



producer



consumer



**series of steps by which
energy is obtained, used,
and changed by
living things**

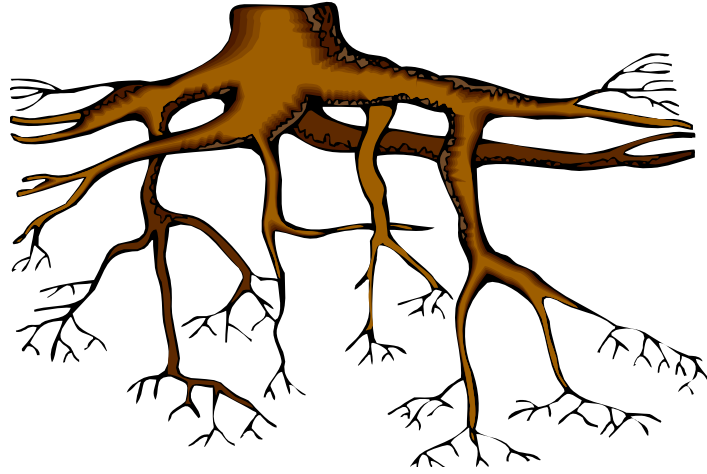
**organism that takes non-
living matter and uses it to
produce food (energy) for
itself with surplus for other
organisms**

**organism that does not
produce own food
organism that feeds on
dead plants and animals**

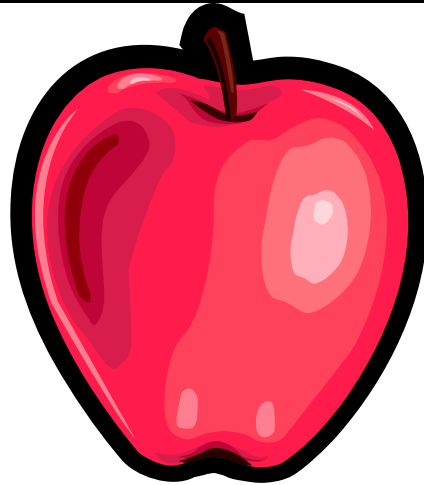
food chain

Food Chain Organism Placards 1

roots



fruit



leaf



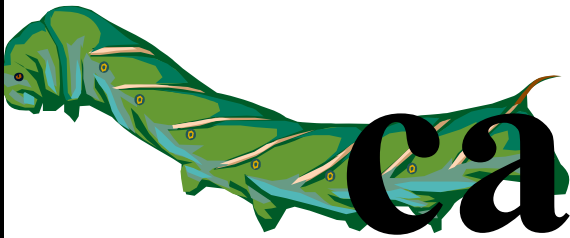
seeds



kelp



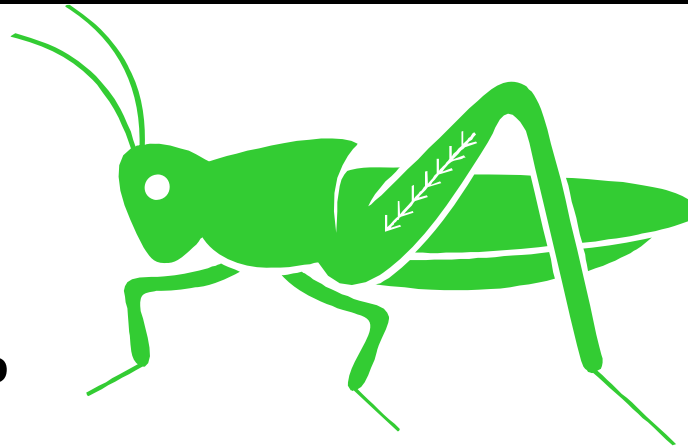
caterpillar



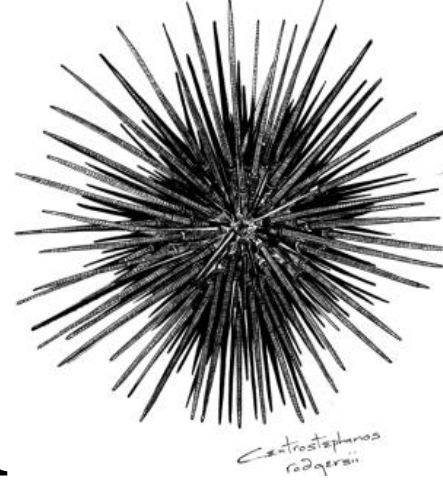
butterfly



grasshopper



sea urchin



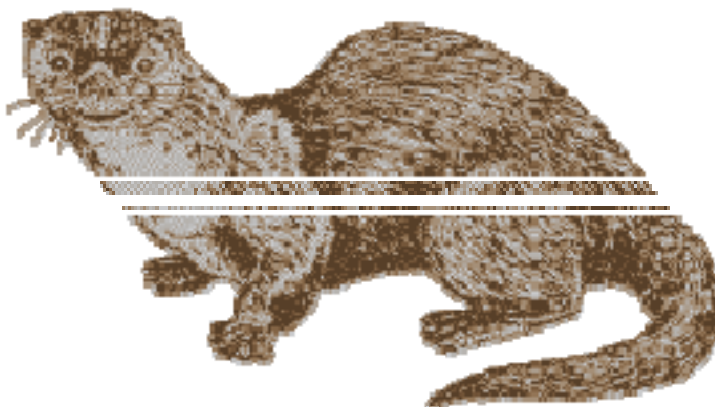
deer



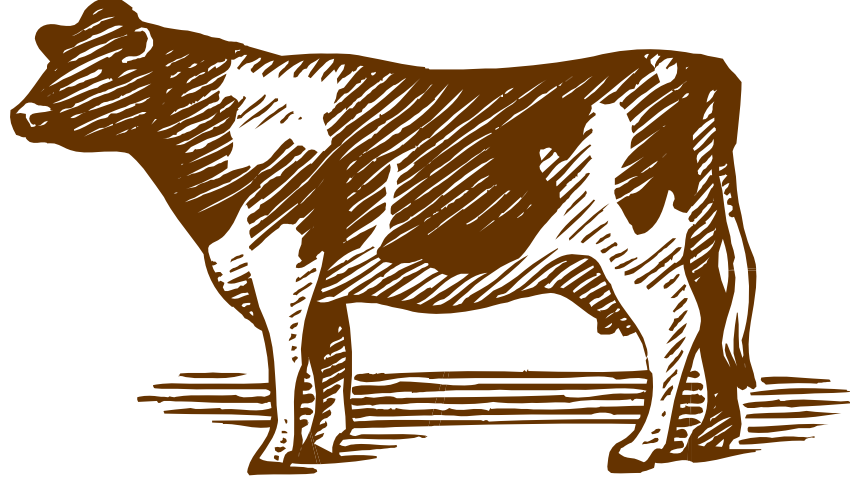
squirrel



otter



cow



chicken



raccoon



human



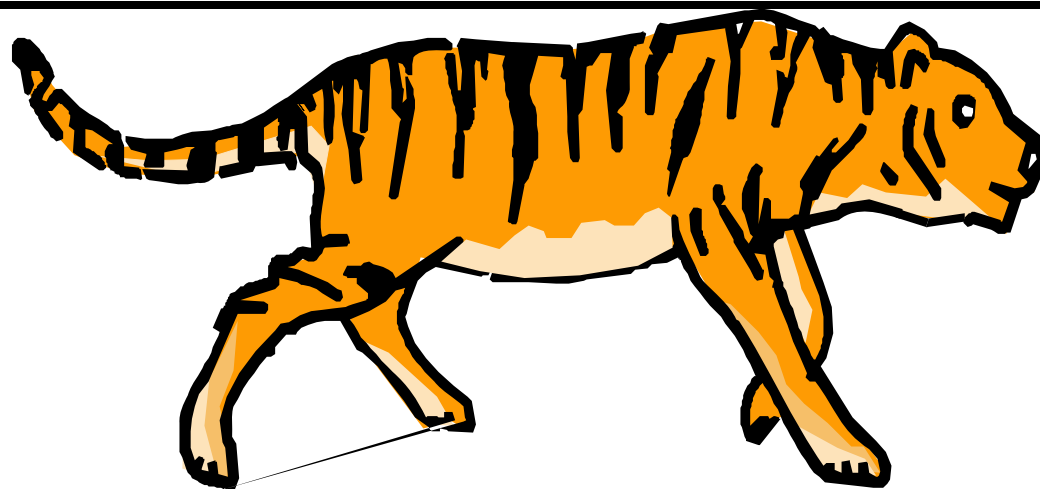
bear



frog



tiger



wolf



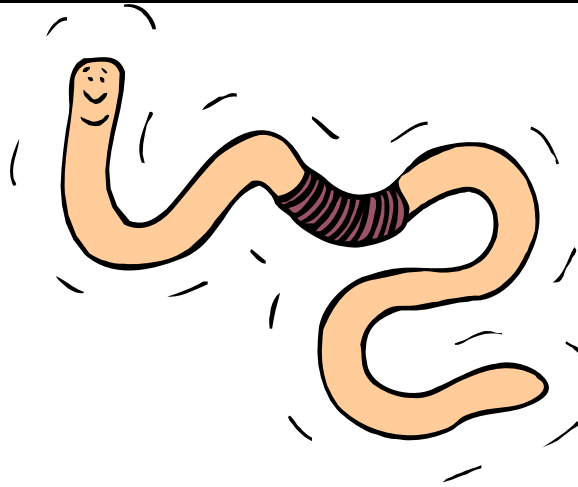
mushroom



insect



worm



bacteria



Day 2 Lesson Plan

Objective:

The student will apply database search strategies to find examples of consumers.

ILSSL and indicator:

1. Standard 1, Indicator 5: The student who is information literate accesses information efficiently and effectively. Develops and uses successful strategies for locating information
2. Standard 9, Indicator 1: The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information. Shares knowledge and information with others
3. Standard 9, Indicator 3: The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information. Collaborates with others, both in person and through technologies, to identify information problems and to seek their solutions

Materials needed:

Provided by teacher:

1. Computers with Internet access for each pair of students.
2. Subscription database to reference/research resource (for example, SIRS)
3. One computer with Internet access with <http://brainpop.com> bookmarked.
4. LCD Projector
5. External computer speakers
6. Projection screen
7. A copy of worksheet 2-A for each student
8. A copy of worksheet 2-C for each student, if additional activity is chosen

9. Black/magnetic board; chalk or dry erase markers

Provided in instructional unit:

1. Worksheet 2-A
2. Worksheet 2-B
3. Worksheet 2-C
4. Worksheet 2-D
5. Placards with magnets on their backs to place on board
 - Three magnetic pictures cards each of herbivores, carnivores, and omnivores
 - Three magnetic terminology cards labeled herbivore, carnivore, and omnivore
 - Three magnetic definition cards for herbivore, carnivore, and omnivore

Presentation and practice formats:

1. Large-group for the motivation activity and for the information and examples
2. Partners for the practice
3. Large-group review of the results and summary discussion

Accommodations:

1. Assign the Asian speaking student a bilingual partner.
2. Assign the ADHD student an organized and focused partner.
3. Provide preferential seating for both ADHD and Asian speaking student.
4. The visual representation used in presenting the content of the lesson will aid the Asian student in following and grasping the material.
5. The partnering activity will aid in increasing interaction and provide an opportunity to practice language.

Type of Instructional Activity	Teacher's Role	Time
Motivation	Arouse students' curiosity in lesson by showing a five minute cartoon from Brainpop.com on food chains that presents the terms herbivore, carnivore, and omnivore.	5 minutes
Information and examples	a) Explain that an herbivore is an animal that eats mainly plants. Have student post herbivore terminology and definition card on board. Give the examples of giraffes that eat leaves from trees, caterpillars that eat leaves from plants, and cows that eat grass. Show pictures of these animals and post under terminology and definition card. b) Explain that a carnivore is an animal that eats mainly meat. Have student post carnivore terminology and definition card on board. Give the examples of lions that eat zebras, spiders that eat flies, and hawks that eat mice. Show pictures of these animals and post under terminology and definition card. c) Explain that an omnivore is an animal that eats both plants and animals. Have student post omnivore terminology and definition card on board. Give the examples of bears that eat berries and fish, raccoons that eat frogs and fruit, and humans that eat many types of foods, from fruits and vegetables to fish and chicken. Show pictures of these animals and post under terminology and definition card. d) Explain that databases can be used to find examples of each of the types of consumers. e) Demonstrate on a computer with LCD projector how the database can be searched using the search terms herbivore and carnivore. f) Demonstrate on a computer with LCD projector how using the name of an animal as a search term retrieves articles that give information about that animal. By reading about the animal's diet, a determination can be made as to whether the animal is an herbivore, carnivore, or omnivore and if it lives on land or in water.	15 minutes

Type of Instructional Activity	Teacher's Role	Time
Practice and feedback	Part I – a) Distribute Worksheet 2-A. b) Group students in pairs to search database for examples of herbivores and carnivores that live on land. c) Have students access the subscription database. d) Have students record the search terms they use to search the database on their worksheets. e) Have students record the examples of consumer types. f) Have students record the sources that give them the examples of each consumer type. Part II – a) Regroup class for discussion. b) Ask each student pair to provide one example of each of the consumer types they found in the database and list on the chalkboard. c) Refer to Worksheet 2-B for examples of consumer types. d) Refer to Worksheet 2-D for an example of a completed Worksheet 2-A.	35 minutes
Additional Examples	Have the students play a “What Kind of Consumer Am I?” game. This is an optional, alternate activity; it is not included in the overall time estimate for this lesson. Ask the following questions; ▪ What kind of consumer eats grass, hay and other plants? Answer – herbivore ▪ What kind of consumer eats mice, rats and bugs? Answer – carnivore ▪ What kind of consumer eats plants and meat? Answer - omnivore	

Type of Instructional Activity	Teacher's Role	Time
Additional practice and feedback	This is optional additional practice; it is not included in the overall time estimate for the lesson. a) Group students into pairs and access the subscription database. b) Distribute Worksheet 2-C c) Ask each student pair to search the database to find two examples of omnivores that live on land and record information on Worksheet 2-C. d) Refer to Worksheet 2-B for examples of consumer types.	
Summary	a) Remind students: we can do a keyword search on a database to find new information such as different types of consumers. b) Remind students: we have learned that there are three types of consumers – herbivores, carnivores and omnivores. Ask students to share what each type of consumer eats.	3 minutes

Food Chain Database Search Results Worksheet 2-A

Name: _____

Date: _____

On the chart below, record the results of your search.

Type of Consumer	Keyword	Name of Article and Source	Example you found
herbivore			
herbivore			
carnivore			
carnivore			

Food Chain Examples of Consumers Worksheet 2-B

herbivore	carnivore	omnivore
caterpillar	cheetah	ant
caribou	frog	bear
cow	hawk	chicken
deer	lion	fly
elephant	lynx	human
giraffe	owl	mouse
goat	praying mantis	pig
horse	snake	raccoon
hummingbird	spider	
lemming	tiger	
musk ox	wolf	
parrot		
rabbit		
sheep		

Food Chain Database Search Results Worksheet 2-C

Name: _____

Date: _____

On the chart below, record the results of your search.

Type of Consumer	Keyword	Name of Article and Source	Example you found
omnivore			
omnivore			
omnivore			
omnivore			

Food Chain Database Search Results Worksheet 2- D

Name: _____

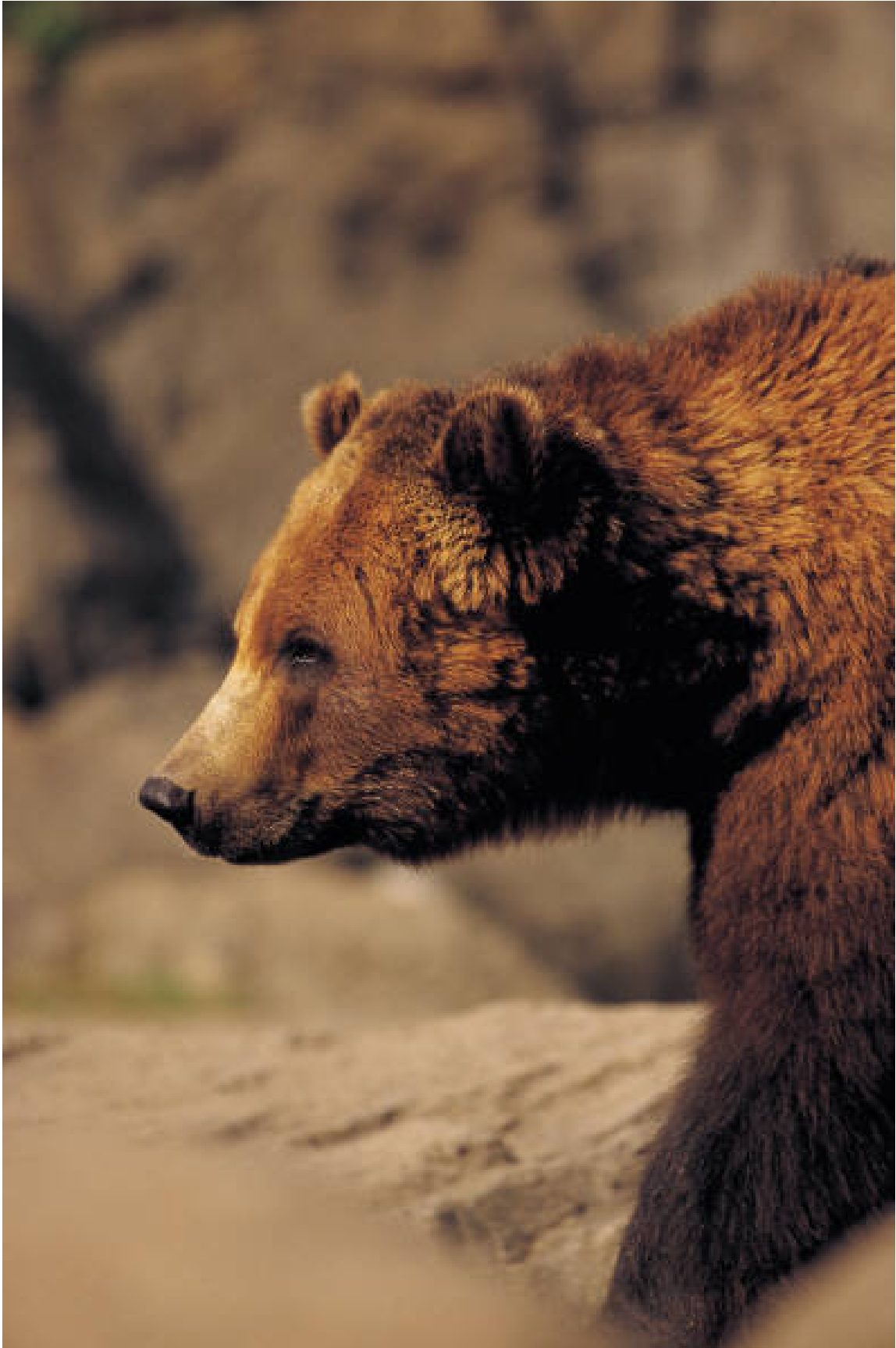
Date: _____

On the chart below, record the results of your search.

Type of Consumer	Keyword	Name of Article and Source	Example you found
herbivore	sheep	Barbary sheep Encyclopedia of Animals	Barbary sheep
herbivore	butterfly	Monarch butterfly Encyclopedia of Animals	Monarch butterfly
carnivore	carnivore	Tasmanian devil Encyclopedia of Animals	Tasmanian devil
carnivore	tiger	tiger Encyclopedia of Animals	tiger

Food Chain Placards 2 -- pictures, terminology, definitions











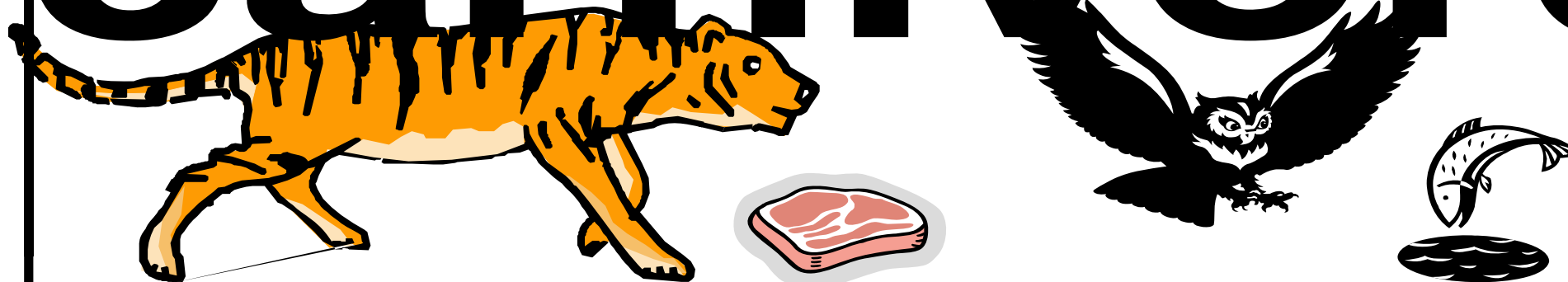




herbivore



carnivore



omnivore



flesh eater

plant eater

**flesh &
plant eater**

Day 3 Lesson Plan

Objective:

The student will organize a list of organisms into a food chain diagram.

Materials needed:

Provided by teacher:

1. 200 pieces of green paper (approximately 1x1 inch squares)
2. Large area marked off either outside or in a gym or multipurpose room.
3. Computer for each student with Internet access (and bookmarked site <http://www.funwithfoodwebs.com>)
4. LCD projector and screen
5. Overhead transparency of class discussion chart and questions (Overhead 3)
6. Copies of Worksheets 3-A, 3-B, and 3-C for each student

Provided in instructional unit:

1. Worksheet 3-A
2. Worksheet 3-B
3. Worksheet 3-C
4. Master copy of class discussion chart and questions (Overhead 3)
5. Worksheet 3-A, answer key
6. Overhead 3, answer key
7. Green construction paper
8. Signs for grasshoppers(16), shrews(6) and hawks(3)
9. Ziploc bags
10. Safety pins
11. String to mark simulation area

Presentation and practice formats:

1. Whole class game and follow-up
2. Independent work on the computer

Accommodations:

1. The interactive game is an ideal teaching strategy for students with ADHD. This activity gets students out of their seats, and the classroom, and allows them to be active.
2. The online activity does not require students to read and is ideal for the student with limited English proficiency. It requires the student to move the graphic of an organism into the appropriate place in the food chain.

Type of Instructional Activity	Teacher's Role	Time
Motivation	Tell students they will be going outside (or to the gym) for part of science class today. Tell them they will act out a food chain.	1 minute
Objective	Tell students they will take a list of organisms and put them into a food chain.	1 minute
Prerequisites	Remind students of the definitions they learned in the previous lessons, including producer, consumer, decomposer, herbivore, omnivore, and carnivore.	3 minutes
Information and examples	Food Chain Game a) Assign each student a role and give each student the sign of the appropriate role. Use safety pins to pin signs onto front of shirts. b) Go over the instructions for the food chain game with the class. • When the teacher says, "Go" the grasshoppers go into the marked off area and gather up as much grass (green paper) as possible into their bags. • After about 30 seconds, the teacher tells the shrews to go. The shrews need to find a grasshopper and tag him. Once the grasshopper is tagged, he needs to turn over his food (bag of grass) to the shrew and goes to the sidelines. During this time, the grasshoppers should be trying to avoid getting eaten (tagged) by the shrews, but will also continue to try to gather more grass. • 30 seconds after the shrews are released, the hawks will be released. They try to tag the shrews and collect the bag(s) of food. While shrews are being chased, they will still try to capture grasshoppers and grasshoppers will still try to collect grass. • Continue for 30-40 seconds and say, "STOP"	12-15 minutes

Type of Instructional Activity	Teacher's Role	Time
Information and Examples (Continued)	c) Take the class to a large open area. If the weather is nice, this activity works well outside. If not, take students to the gym or multi-purpose room. d) Give each grasshopper a Ziploc bag. e) Spread the grass (paper) around the area. f) Line up the grasshoppers on the edge of the area. g) Begin activity. h) Once all groups have been released and time is up, the teacher will instruct the students who are still in play (have not been eaten) to carry their food bags with them to the classroom. Keep this group separate from the eaten group. (All students who were eaten, will not have food bags) i) Tell students who do not have food bags to sit on one side of the room and students who have food to sit on the other. Instruct students who have bags of food to count how many pieces of food are in their bags. Game De-briefing As a class, fill out the chart. (Overhead 3) On the chart, list how many organisms in each category you started with and how many you ended with.	10 minutes
Practice and feedback	a) Pass out Worksheet 3-A. On this worksheet are the names of the organisms used in the game. Instruct students to draw a food chain using the organisms listed. b) Remind students to think back to the game to determine the levels of the food chain.	Part 2: 10 minutes

Type of Instructional Activity	Teacher's Role	Time
Additional examples	This additional activity can be added if time permits or if students need additional reinforcement after the simulation game. a) Tell students that they are going to create a few more examples of food chains. b) Escort students to the computer lab. Instruct students to go to the book marked site "Fun with Food Webs" (http://www.funwithfoodwebs.com) c) Using the LCD projector, show the Meadow food chain with the students. d) Explain to students that they need to click on a picture of an organism and move it to the correct location on the food chain. Show the students what happens if an organism is put in the wrong and right place. As a class, complete the Meadow food chain. e) Show the students where to locate hints if they are having trouble. f) Instruct the students to complete the remaining two food chains independently.	20 minutes
Additional practice and feedback	a) Tell students that they will be creating their own food chain for homework. b) Pass out Worksheet 3-B and 3-C c) Explain that these worksheets have pictures of several different organisms. Their homework is to cut out the organisms and glue them into a food chain. d) Explain that they do not need to use all of the organisms on the worksheet, but their food chain will have at least 5 levels.	4 minutes
Summary	Remind students that there are different levels of consumers. Tell them that some consumers (omnivores and carnivores) eat other consumers (herbivores), which is how we end up with multi-level food chains	2 minutes

Food Chain Overhead 3

Directions: As a class, tally up how many organisms there were at the start of the activity and at the end. Fill in the chart and answer the questions.

	Number at Start	Number at End
Grass		
Grasshoppers		
Shrews		
Hawks		

Discussion Questions:

1. Why do you think there were more grasshoppers than shrews at the beginning?
2. Why was the number of hawks the same in the beginning and the end?
3. Why did the shrew take the grasshopper's bag of grass when he was tagged?

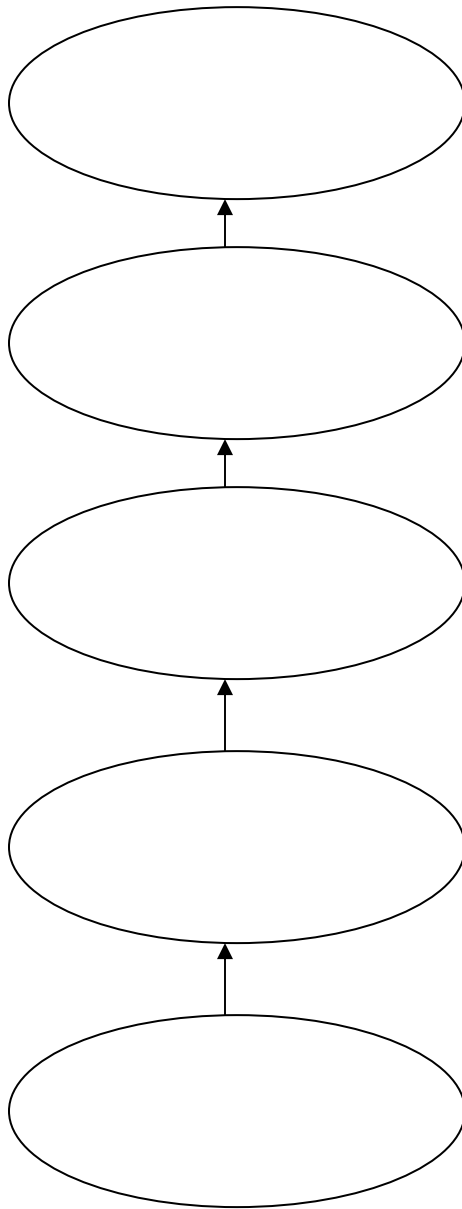
Food Chain Worksheet 3-A

Name _____

Date _____

Directions: Use the words in the word box below to fill in the food chain.

Shrew	Grasshopper	Sun	Hawk	Grass
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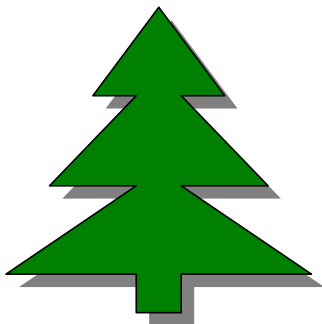
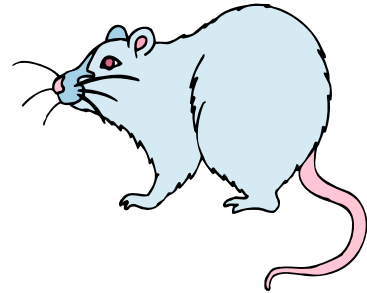
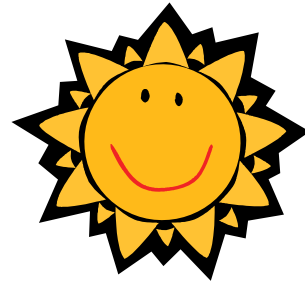


Food Chain Worksheet 3-B

Name _____

Date _____

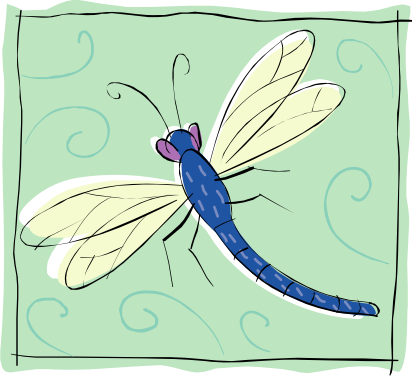
Directions: Using any of the pictures on this page or on Worksheet 3-C, create a food chain. Your food chain should include at least 4 organisms. Cut out the organisms and glue them in order onto a sheet of paper.



Food Chain Worksheet 3-C

Name _____

Date _____



Food Chain Overhead 3, answer key

Directions: As a class, tally up how many organisms there were at the start of the activity and at the end. Fill in the chart and answer the questions.

	Number at Start	Number at End
Grass	<i>Numbers will vary for each class.</i>	
Grasshoppers		
Shrews		
Hawks		

Discussion Questions: *Answers will vary, but the following are typical answers.*

1. Why do you think there were more grasshoppers than shrews at the beginning?
The lower levels of the food chain need more organisms than top to support the higher level organisms. Energy is lost at each level of the food chain.
2. Why was the number of hawks the same in the beginning and the end?
Hawks are at the top of the food chain. No other animals use the hawk for food.
3. Why did the shrew take the grasshopper's bag of grass when he was tagged?
The shrew took the grasshopper's bag because when the shrew eats the grasshopper he gets all of the grasshopper's energy. The grasshopper got his energy from the grass.

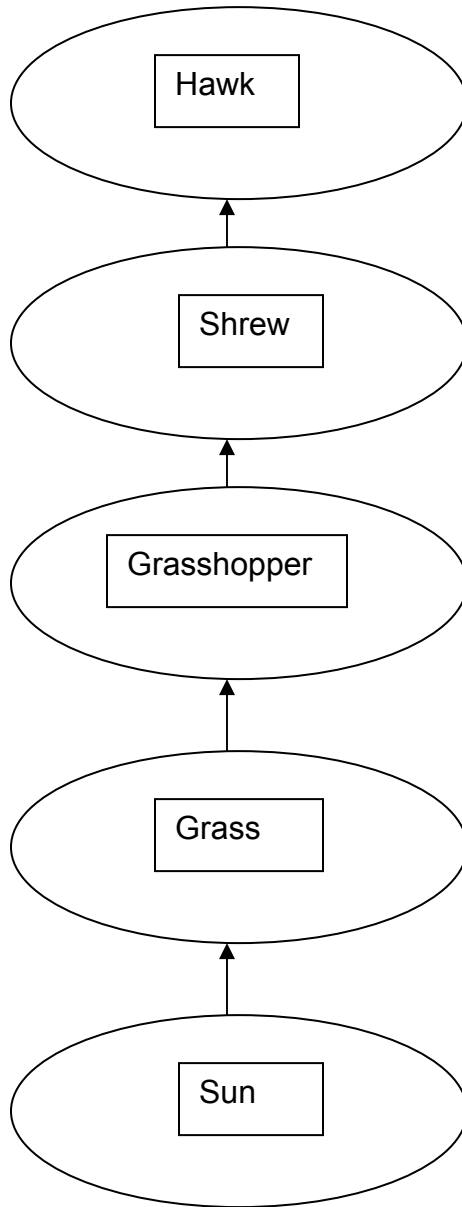
Food Chain Worksheet 3-A, answer key

Name _____

Date _____

Directions: Use the words in the word box below to fill in the food chain.

Shrew	Grasshopper	Sun	Hawk	Grass
-------	-------------	-----	------	-------



Day 4 Lesson Plan

Objective:

The student will predict how an event at one level of the food chain will impact the entire chain.

ILSSL and indicator:

Standard 9, Indicator 3: The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information. Collaborates with others, both in person and through technologies, to identify information problems and to seek their solutions

Materials needed:

Provided by teacher:

1. News pictures of natural disasters
2. Dry erase board; markers
3. Computer for each pair of students with Internet access to:
http://www.ecokidsonline.com/pub/eco_info/topics/frogs/chain_reaction/index.cfm#
4. LCD projector
5. Projection screen
6. A copy of Worksheet 4 for each student
7. A copy of Exit Card 4 for each student

Provided in instructional unit:

1. Food Chain chart
2. Picture book *The Otters' Story* by award-winning author and illustrator, Joseph Bruchac, which describes the depletion of otters off the west coast of North America that disrupts an entire food chain.
3. Twenty-four medium plant/animal organism cards from Day One.

4. Exit Card 4
5. Worksheet 4
6. Worksheet 4, answer key
7. Alternate Activity Cards 4 labeled sun, plant, insect, toad, snake, hawk

Presentation and practice formats:

1. Large-group instruction and a small-group activity during presentation
2. Paired collaborative activity and individual practice worksheet during student practice

Accommodations:

1. Assign the Asian-speaking student a bilingual partner and assign the ADHD student an organized and focused partner for the Internet-based activity.
2. Provide preferential and easily supervised seating for both the ADHD and Asian-speaking student during large-group presentations.

Type of Instructional Activity	Teacher's Role	Time
Motivation	a) Display news pictures of natural disasters, such as droughts, floods or hurricanes. b) Brainstorm and list the results of the disasters, i.e. drought – plants die with no water; floods – animals die because habitat destroyed.	5 minutes
Objective	Tell the students they will discover how an event at one level of the food chain will affect all of the organisms, creating a 'domino-like' effect.	2 minutes
Information and examples	a) Read aloud the picture book, <i>The Otters' Story</i> by Joseph Bruchac. b) Have the students identify the organisms and their roles in this food chain. c) Call individual students up to the board to arrange organism cards to create the food chain. d) Discuss the events of the story and the chain reaction caused by the disturbance at one level of the food chain. e) Demonstrate the chain reaction by asking individual students to remove the appropriate organism(s) in the food chain.	15 minutes
Practice and feedback	a) Tell the students they will build a food chain on the website and then observe the results when there is a change at one level of the food chain. b) Group the students into pairs to complete the online activity. c) Introduce and demonstrate the site navigation to the entire class. d) Before students complete Part II of the activity, ask them to predict what will happen if one organism is eliminated from the food chain. e) Have students complete Part II and determine if their prediction was correct. f) Discuss the results of eliminating the frog from the food chain after the students have finished the online activity.	30 minutes

Type of Instructional Activity	Teacher's Role	Time
Additional examples	Have students perform a food chain simulation to determine what happens when a food chain is broken. This is an optional, alternate activity; it is not included in the overall time estimate for this lesson. a) Pin a card labeled sun, plant, insect, toad, snake, or hawk on six students. b) Stand in a line and hold hands in this order: sun-plant-insect-toad-snake-hawk. c) Ask the following questions: ▪ What animals will die if there were no snakes to eat? (The snake person drops hands.) ▪ What animals will die if there were no toads to eat? (The toad person drops hands.) ▪ What animals will die if there were no insects to eat? (Insect person drops hands.) ▪ What animals will die if there were no plants to eat? (Plant person drops hands.) ▪ What will happen if there were no sun to let plants grow?	
Additional practice and feedback	a) Give each child an exit card at the end of the lesson. The exit card describes a change at one level of a particular food chain. The student must correctly select the organism which will be affected by that change. b) The student returns a completed <i>exit card</i> before leaving the classroom. c) Assign Worksheet 4 for homework to reinforce the lesson objective.	5 minutes
Summary	Remind students that all organisms in the world are linked by food chains. A change in one link affects every organism in the entire chain.	2 minutes

Food Chain Chart 4

The Food Chain



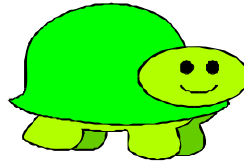
The Sun

Green Plants

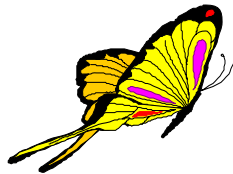


The Producers

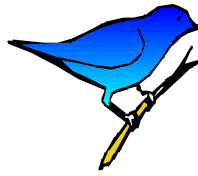
Herbivores



The Consumers



Carnivores



The Decomposers



Green Plants



Food Chain Exit Card 4

Name _____

Date _____

Circle the organisms that are affected when the frog is taken out of the food chain.

Grass → Grasshopper → Frog → Snake

Food Chain Worksheet 4

Name_____

Date_____

Each situation describes a change in a food chain environment. In complete sentences describe how the changes will affect the organisms in each food chain. Support your answers with specific details.

1. Over harvesting depletes much of the crab population.

Duckweed → Crabs → Herons

2. Hunters wipe out most of the bear population in the forest.

Trees → Deer → Bears

3. A lawn care company sprays poisonous fertilizer on the grass.

Grass → Grasshoppers → Frogs → Snakes

Food Chain Worksheet 4, answer key

Name _____

Date _____

Each question describes a change in a food chain environment. In complete sentences describe how the changes will affect the other organisms in the food chain. Support your answers with specific details.

1. Over harvesting depletes much of the crab population.

Duckweed → Crabs → Herons

The duckweed grows too thick and blocks sunlight in the water. The herons move away because there is nothing to eat.

2. Hunters wipe out much of the otter population.

Sea Weed → Sea Urchins → Otters

The sea urchins eat all of the sea weed and there is not enough for other animals in the ocean. Pretty soon the sea weed starts to die off because the urchins are eating it all. The other animals will go away to search for other food.

3. A lawn care company sprays poisonous fertilizer on the grass.

Grass → Grasshoppers → Frogs → Snakes

The grasshoppers will get sick and die from eating grass poisoned by the fertilizer. Then the frogs will not have any food and they will die or move away. And finally, the snakes will not have any food without the frogs.

Food Chain Alternate Activity Cards 4

sun

plant

insect

toad

snake

hawk

Day 5 Lesson Plan

Objective:

The student will construct a food chain.

Materials needed:

Provided by teacher:

1. 25 wire coat hangers
2. Enlarged picture of food chain mobile (on overhead or poster paper.)
3. Copy of Worksheet 5 for each student

Provided in instructional unit:

1. Food chain mobile graphic
2. Worksheet 5
3. Worksheet 5, answer key
4. Construction paper (variety of colors)
5. Colored pencils, crayons or markers
6. Hole Punches
7. Yarn
8. Scissors

Presentation and practice formats:

Students will be required to work independently on this activity.

Accommodations:

1. Students with limited English proficiency may need assistance in brainstorming organisms that live in a particular ecosystem. The teacher may want to allow these students to use the cards that were used in previous lessons to help in determining animals and plants to use.
2. Although this is a hands-on activity, students with attention issues may need to be reminded frequently to remain on task.

Type of Instructional Activity	Teacher's Role	Time
Motivation	Tell students they will be using everything they have learned in the past week and creating their own food chain mobile.	1 minute
Objective	Tell students they will create their own food chain	1 minute
Prerequisites	Remind students of the different levels in a food chain. Also, remind students that there are different levels of consumers. Review the different levels with the class.	3 minute
Information and examples	a) Show students the example of a food chain mobile (On overhead or poster.) b) Discuss the requirements of the mobile. Tell students their mobile must include at least 4 different organisms. The organisms will be drawn on construction paper, cut out, and hung on the mobile with yarn. Tell students that when they construct their mobile, they will hang the organisms with the top organism in the food chain closest to the hanger and the other organisms will hang below it to create the chain. (Point out on the example how this is done.) c) Tell students that before they begin to construct their food chain, they need to determine which organisms will be in it. Tell the students they will create their food chain on paper first. Once they have finished, they need to show the teacher to verify that the food chain is accurate. Once the teacher approves the food chain, the student may begin the construction of the food chain mobile. d) Pass out Worksheet 5. Instruct students to think of different land ecosystems. Ask the class for suggestions and list these on the board. If students have difficulty at first, give them a few examples, such as forest, desert, or their front yard. e) After there is a list of areas on the board, tell students to choose the area they want to use and write it on their paper. Then tell students to brainstorm ideas for organisms that live in the ecosystem they chose that could be part of the food chain.	Part1: 25 minutes

Type of Instructional Activity	Teacher's Role	Time
	f) Tell students to take the brainstorming list and pick at least 4 organisms from it that will go together in a food chain. Tell students to write these down on the chain. Tell students that if they want to include more than four organisms, they can draw additional circles on the paper to accommodate them. g) Tell students that once they have written the organisms in their food chain, they may come to the teacher to determine if the food chain is accurate. If it is, they can move on, if not, they need to go back and fix the food chain.	
Practice and feedback	a) Tell students that once their food chain has been approved, they may pick up supplies to create their food chain. b) Instruct students to use the construction paper to draw their pictures. They then need to cut out the pictures. c) Once students are done coloring and cutting out their pictures, demonstrate how to punch a hole in the picture and string it with yarn. d) Once all pictures are strung together, show students how to attach them to the hanger.	45 minutes
Summary	a) Give students time to share their food chain mobiles, if they wish. b) Remind students that they will have a test of the food chain the next school day.	10 minutes

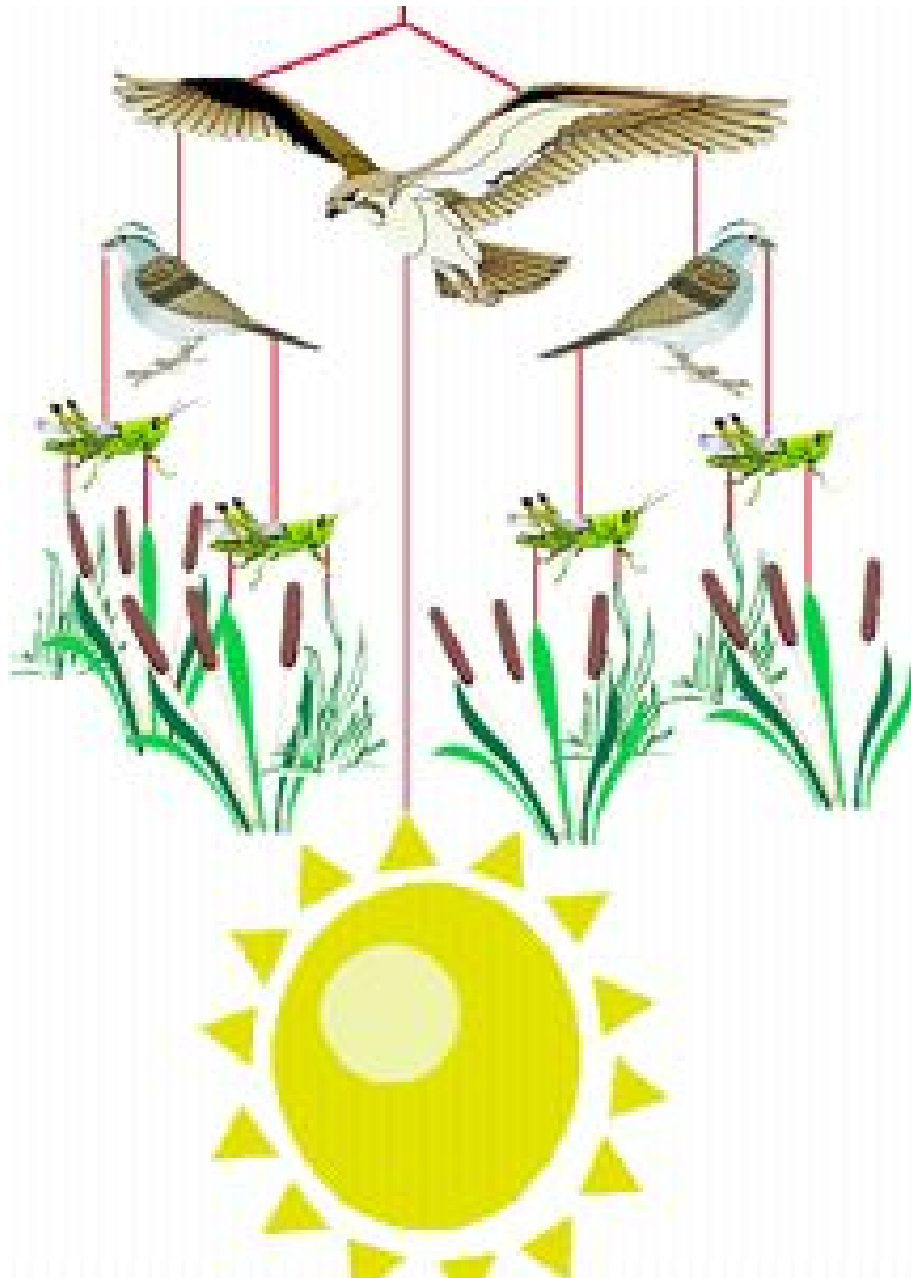
Food Chain Mobile Rubric 5

Name _____

Date _____

Category	4	3	2	1
Required Elements	The mobile includes all the required elements as well as additional information.	All required elements are included on the mobile.	All but one of the required elements are included on the mobile.	Several required elements are missing.
Graphics	All graphics are related to the topic and make it easy to understand	All but one graphic are related to the topic.	Some of the graphics do not relate to the topic.	Graphics do not relate to the topic.
Attractiveness	The mobile is exceptionally attractive in terms of design, layout, and neatness.	The mobile is attractive in terms of design, layout, and neatness.	The mobile is acceptably attractive, though it may be a bit messy.	The mobile is distractingly messy or very poorly designed.
Rough Draft	Student completed a rough draft/worksheet and had it approved by the teacher prior to starting on the mobile. No alterations were made after approval.	Student completed the rough draft worksheet, but made minor alterations to approved draft.	Student completed the rough draft worksheet, but did not get it approved by the teacher or made significant changes to the approved draft.	Student did not complete the rough draft worksheet.

Food Chain Mobile Graphic 5



Food Chain Worksheet 5

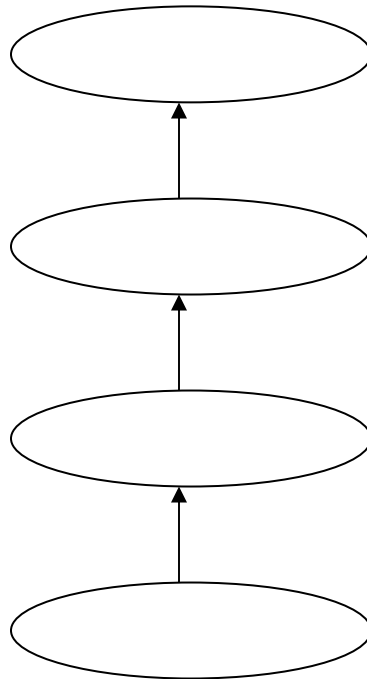
Name _____

Date _____

Which ecosystem will you use for your food chain?

List organisms that live in this ecosystem. (List as many as you can think of.)

Select at least 4 organisms from your list above that create a food chain. Write these organisms in order on the food chain below. You may use more than 4 organisms if you like. If you choose to do so, you will need to add additional circles to the diagram below.



Food Chain Worksheet 5, answer key

Name _____

Date _____

Answers will vary depending on the ecosystem chosen. The answers below are a sample of a student response.

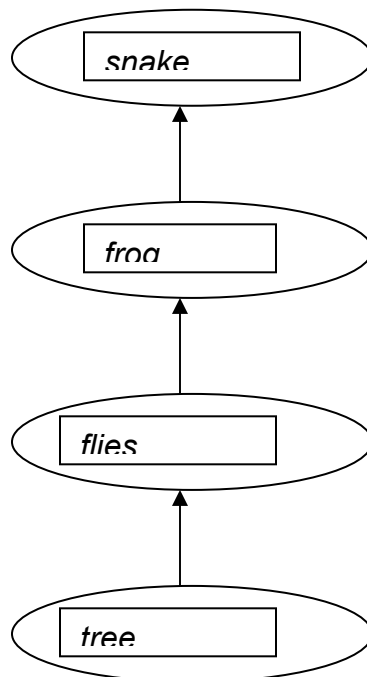
Which ecosystem will you use for your food chain?

_____ *jungle* _____

List organisms that live in this ecosystem. (List as many as you can think of.)

snakes, monkeys, dung beetles, mushrooms, trees, frogs, flies

Select at least 4 organisms from your list above that create a food chain. Write these organisms in order on the food chain below. You may use more than 4 organisms if you like. If you choose to do so, you will need to add additional circles to the diagram below.



Food Chain Assessment

Name_____

Date_____

1. Draw a line from a food chain term to its definition.

sun	does not produce own food
producer	necessary source of energy for producers
food chain	living organism which feeds off dead plants and animals
decomposer	living organism that takes non-living matter and uses it to produce food (energy) for itself with surplus for other living organisms
consumer	series of steps by which energy is obtained, used, and changed by living organisms

2. Put the following 11 living organisms into their proper categories.

acorns, dogs, ants, mushrooms, deer, chickens, grass, flowers, carrots, bears, worms

Producers	Consumers	Decomposers

3. Place the organisms from the Chesapeake Bay ecosystem below on the food chain.

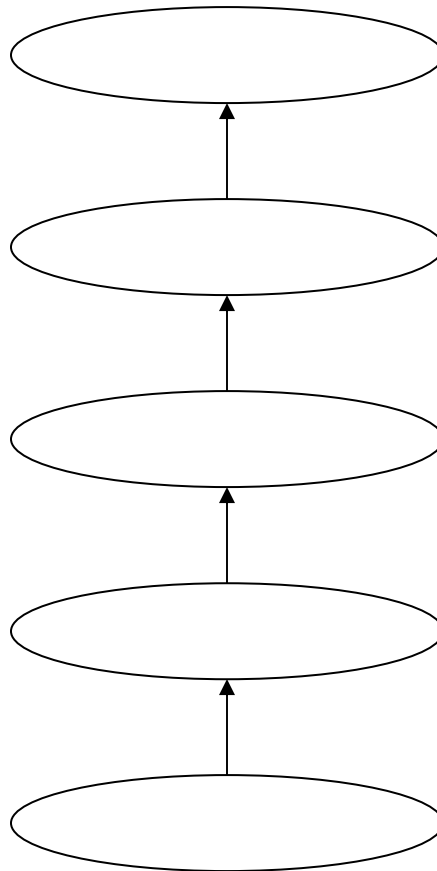
Bald Eagle

Bay Grasses

Crab Larvae

Anchovy

Rockfish



The question below describes a change in a food chain environment. In complete sentences describe how the change will affect the other organisms in the food chain. Support your answer with specific details.

4. Over harvesting depletes much of the crab population.

Duckweed → Crabs → Herons

5. Search a subscription database to find examples of ocean organisms that represent each level of the food chain. Record the results of your search in the table below.

Name of Organism	Level of food chain	Name of article

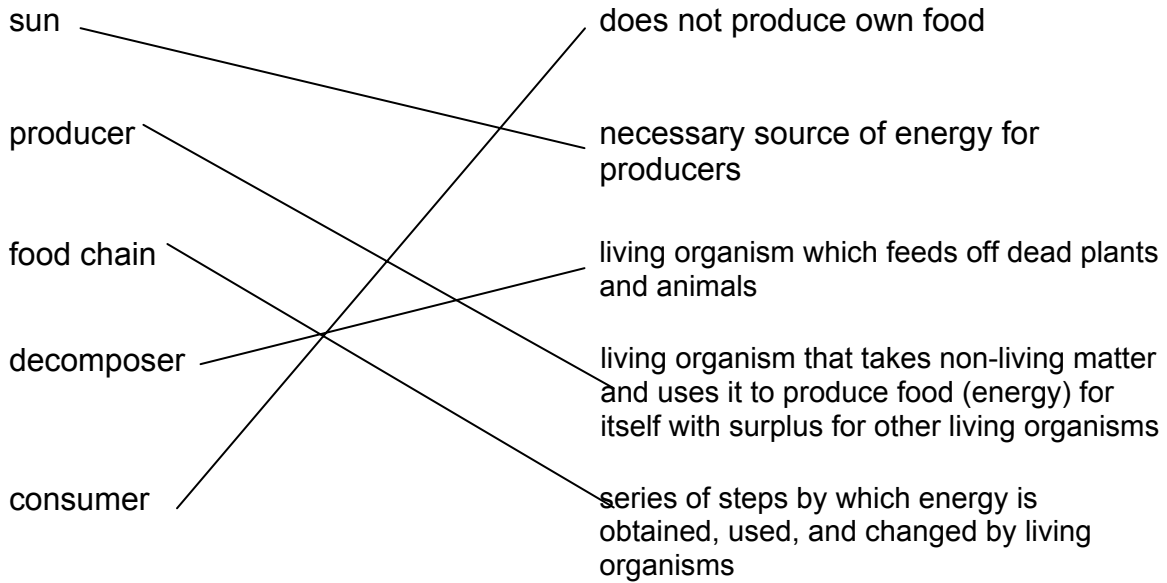
6. In the space below, draw a food chain using the organisms found during your research. Be sure to draw arrows to link your food chain organisms together. Label each organism with the organism name and its role in the food chain (producer, composer, decomposer.)

Food Chain Assessment, answer key

Name _____

Date _____

1. Draw a line from a food chain term to its definition.



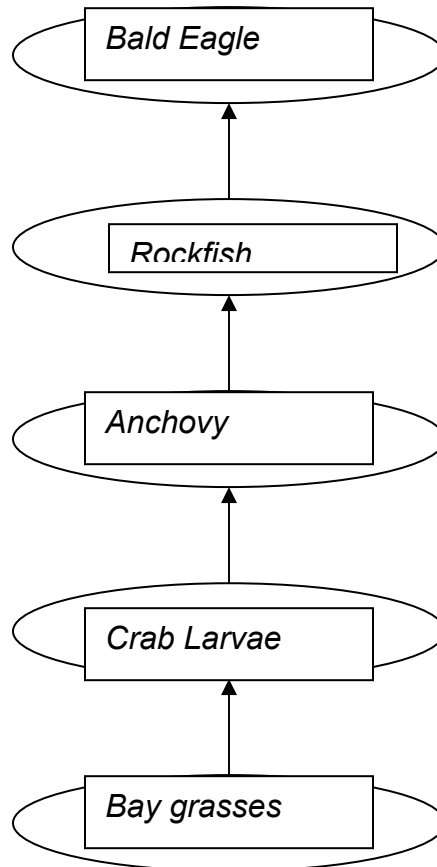
2. Put the following 11 living organisms into their proper categories.

acorns, dogs, ants, mushrooms, deer, chickens, grass, flowers, carrots, bears, worms

Producers	Consumers	Decomposers
<i>acorns</i> <i>flowers</i> <i>carrots</i> <i>grass</i>	<i>dogs</i> <i>deer</i> <i>chickens</i> <i>bears</i>	<i>ants</i> <i>worms</i> <i>mushrooms</i>

3. Place the organisms from the Chesapeake Bay ecosystem below on the food chain.

Bald Eagle Bay Grasses Crab Larvae Anchovy Rockfish



The question below describes a change in a food chain environment. In complete sentences describe how the change will affect the other organisms in the food chain. Support your answer with specific details.

4. Over harvesting depletes much of the crab population.

Duckweed $\longrightarrow$ Crabs $\longrightarrow$ Herons

Answers will vary. Students need to explain that the removal of crabs will result in the herons dying off due to lack of food. They should also explain that the duckweed will become overpopulated once it is no longer being eaten by the crabs.

5. Search a subscription database to find examples of ocean organisms that represent each level of the food chain. Record the results of your search in the table below.

Name of Organism	Level of food chain	Name of article

6. In the space below, draw a food chain using the organisms found during your research. Be sure to draw arrows to link your food chain organisms together. Label each organism with the organism name and its role in the food chain (producer, composer, decomposer.)

Answers will vary. A rubric has been attached for teacher use in grading this part of the assessment.

Food Chain Rubric (Assessment Question 6)

Name_____

Date_____

Category	4	3	2	1
Required Elements	The food chain includes all the required elements as well as additional information.	All required elements are included on the food chain.	All, but one, of the required elements are included.	Several required elements are missing.
Graphics	All graphics are related to the topic and make it easy to understand.	All but one graphic are related to the topic.	Some of the graphics do not relate to the topic.	Graphics do not relate to the topic.
Labels	All graphics are clearly labeled.	One graphic is missing a label.	Some of the graphics are missing labels.	All graphics are missing labels.

Formative Evaluation

The formative evaluation of this unit of instruction will be carried out in three phases. Phase one will include review by a subject matter expert and any necessary revision. Phase two will be conducted with an interview with three students. During phase two, we will attempt to identify any large problems. The first two phases will be conducted relatively early in the design process, just after all the lessons and materials have been drafted. Information obtained from the students will be used to revise the lesson. Phase three will be conducted with a small-group of about eight students on the revised materials. The group will be composed of students with a mix of reading and scientific content abilities. This diverse group will help ensure that the instructional design will be effective for learners with varying abilities and needs.

In phase one an instructional design expert with a background in elementary science content will review the instructional plans and materials. The expert will be given the materials with a critiquing guide that contains the following questions:

- Is the content accurate and up-to-date?
- Are the examples realistic?
- Do the practice exercises and activities allow for adequate opportunity for practice and constructive feedback?
- Is the instruction appropriate for the learners?
- Is the instruction appropriate for the objectives?
- Is the material sequenced logically?

- Are you comfortable with introducing the concept of the food chain without introducing the concept of the food web?
- Are the definitions of carnivore, omnivore, and herbivore correct to the best of your knowledge?
- Is the pace of the lessons appropriate?
- Is the difficulty level appropriate?
- Are the instructional materials easy to understand?
- Do the graphics accurately represent the content?
- Is the final assessment too long for fourth graders?
- Do the instructions for the game in Lesson Three make sense?

The expert will be asked what improvements are recommended for the unit and what they found most and least valuable about the instruction.

Since the review was probably done in addition to the expert's usual responsibilities, it is recommended that the results of the questionnaire be discussed over lunch. The instructional designer will treat, of course. This will give the designer a chance to show appreciation for the expert's time and efforts and, more importantly, create a relaxed atmosphere to discuss in detail the results of the expert's review.

Phase two will be conducted with three carefully selected students. One student will be of average ability, one student of below average ability and one student of above average ability. This small grouping will be selected as being representative of the targeted fourth grade learners. The designer will verbally walk

through each lesson and explain what will be happening in the classroom. Students will be interviewed by the designer and asked the following questions:

- For Lesson One – What did you know about food chains before starting this unit?
- What big thing did you learn from this lesson?
- Did the activities help you understand the big idea?
- Do the activities make you want to learn more about food chains?
- Is there enough time for the practice?
- Is the lesson too hard, too easy, or just right?
- Is the information covered too fast, too slow, or just right?
- Is the final test fair?

They will also be asked to discuss what changes they would suggest in the lessons and what their most and least favorite activities were. The information obtained in these interviews will be used to revise the instruction and/or the instructional materials. If the activities did not communicate the intended objective, they will be modified or redesigned. Any items that were unclear could have more instructional time devoted or be rewritten in simpler, clearer language.

Phase three will include an evaluation by a small-group of eight students. These students will be carefully selected as a representative sample of the targeted fourth grade students. This phase will focus on gathering information for further refinement of the instructional plan. An instructor unfamiliar with the unit will be given the instructional unit and will teach the entire unit to the small-group. Information will be obtained from the instruction, including test scores and actual

time taken to progress through instruction and activities. When the unit is finished, students will complete a written questionnaire comprised of questions similar to the ones asked in phase one and two of the formative evaluation. A focus group will be conducted by the instructional designer with the eight students. The focus group will be used to collect more detailed information about the answers given on the questionnaire. The instructor for the unit will be interviewed over lunch to solicit reflections and suggestions for improvement of the instructional plan. The information gathered from the questionnaire, focus group, and the interview will be used to make decisions about additional revisions to the instructional unit.

Consulted

Evaluation tools. (n.d.). Retrieved November 5, 2005, from Georgia Tech Web site: http://mime1.marc.gatech.edu/MM_Tools/evaluation.html

Williams, B. O. (n.d.). *Designing & conducting formative evaluation.* Retrieved November 5, 2005, from Penn State University Web site: http://www.courses.psu.edu/trdev/trdev518_bow100/D_C10present/

in addition to consulting course notes and reading to expand knowledge and understanding of formative evaluations.

Reflection

The ISD process is necessary in order to produce high quality teaching materials, but it is not without its challenges. The Chain Gang feels that we were able to overcome these challenges to produce a solid unit.

In order to focus ourselves, we first developed a goal and objectives. The group spent a significant amount of time working on our objectives. Particular emphasis was placed on the verbs in the objectives. We felt that the verbs we chose would dictate the direction our unit took, so it was important to choose carefully.

Once we were satisfied with our goal and objectives, our next challenge was the learner analysis. The background knowledge, developmental levels, and social characteristics of our learners played an important role in determining the types of instruction and activities our lessons would have. Developing the learner analysis for the purpose of this assignment was much easier than developing one in real life. We had the luxury of creating an ideal class that had all the background knowledge they needed, a home atmosphere that valued school, and no students with significant learning disabilities. We know, however, that in real schools the ideal class rarely exists and our challenge as teacher/media specialists is to create or alter lessons to meet the needs of all of our learners.

The group decided to use backward planning when it came to lesson planning. As we developed each objective, we planned what type of assessment we would use. By knowing how we were going to assess, we were able to tailor our lessons to match the assessment. By doing this, we were able to ensure our test items were

matched to the objective and that our lesson activities provided enough information and practice to complete the assessment.

In terms of a group, we feel we were very fortunate. Every part of the collaboration ran smoothly. As a group, we were open to others' ideas. If a member shared an idea, all other members were able to appreciate it. In the rare instance when we had a difference of opinion, group members would discuss the differences and come to a reasonable conclusion. No differences in opinion were ever taken personally.

Each group member had an area of expertise that was invaluable to the group. Maureen was our technology whiz, Brenda gave us insight into the teaching aspects of our lessons, Caren took our rambling thoughts and made them into articulate ideas, and Buff kept the group focused and added creativity. By playing on the strengths of the group members, we were able to break up the tasks into manageable chunks for each person. All of the members of the group did their fair share and each person's contribution was vital to the final product.

Throughout this project, we have learned several things. First, we learned that the ISD process is challenging. Deciding on goals and objectives and creating activities and assessments to match them can be, at times, frustrating. We also feel that having gone through the process, we have a much better understanding of how we need to plan when we become library media specialists. We also learned that collaboration is a wonderful thing and it does work. Collaboration requires the stakeholders to work together, to recognize one another's strengths and

weaknesses, and to share knowledge. Finally, we learned that we do not want to see another food chain for a very long time.

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