

Performance Standards Framework for Science – Energy Flow

Cannons Point Unit: (Approximate Time: 5 Days)

OVERVIEW: This unit will be using a more hands on approach to teach the student that the sun is the main source of energy for all living things and that organisms depend on one another as well as their environment for survival.

STANDARDS ADDRESSED IN THIS UNIT

Focus Standards:

S7L4. Students will examine the dependence of organisms on one another and their environments.

- a) Demonstrate in a food web that matter is transferred from one organism to another and can recycle between organisms and their environments.
- b) Explain in a food web that sunlight is the source of energy and that this energy moves from organism to organism.
- c) Recognize that changes in environmental conditions can affect the survival of both individuals and entire species.
- d) Categorize relationships between organisms that are competitive or mutually beneficial.

Supporting Standards:

S7CS5. Students will use the ideas of system, model, change, and scale in exploring scientific and technological matters.

- a) Observe and explain how parts can be related to other parts in a system such as predator/prey relationships in a community/ecosystem.

CONCEPTS: Students will understand the following
<ul style="list-style-type: none"> • The sun is the primary source of energy for the living world. • The food web demonstrates that all energy is transferred and recycled among organisms and their environment. • Organisms depend on one another as well as their environment for survival.
LANGUAGE:
<ul style="list-style-type: none"> • Herbivore • Carnivore • Omnivore

<ul style="list-style-type: none"> • Producer • Primary Consumer • Secondary Consumer • Tertiary Consumer • Predators • Prey • Scavenger • Decomposer • Trophic Level • Food Web • Symbiosis • Parasitism • Mutualism • Commensalism • Competition • Adaptation • Photosynthesis • Predation • Carrying Capacity • Limiting Factor 	
MISCONCEPTIONS	PROPER CONCEPTIONS
<ul style="list-style-type: none"> • In a food web, a change in one population will only affect another population if the two populations are directly related as a predator and prey. • Organisms higher in the food web eat everything that is lower in the food web. • Varying the population size of species will only affect the others that are directly connected through a food chain. • The top of the food chain has the most energy because it accumulates up the chain. • Symbiosis means that both organisms benefit. • Food webs have to do with spiders. • Humans do not get energy from the sun. • Matter cannot be changed. • Energy cycles through ecosystems like nutrients cycle. 	<ul style="list-style-type: none"> • Any change in a food web will eventually affect all the organisms within the food web. • Organisms at the top of the food chain are adapted to a particular diet. That diet does not include all of the organisms in the food chain. • You cannot alter one population without there being an effect on other populations due to the interrelated nature of the biomes. • Energy is lost from one trophic layer to the next. The top layers of an energy pyramid have the least amount of available energy to be passed along.

ENDURING UNDERSTANDINGS

Students will understand that: In all environments-freshwater, marine, forest, desert, grassland, mountain, and others-organisms with similar needs may compete with one another for resources, including food, space, water, air, and shelter. In any particular environment, the growth and survival of organisms depend on the physical conditions.

ESSENTIAL QUESTIONS:

- 1) Explain the differences between a food chain and a food web.
- 2) Where does all of the energy for all organisms come from?
- 3) Why is each organism in an ecosystem important?
- 4) What are the three types of relationships organisms have?

EVIDENCE OF LEARNING:
TASKS (found in the appendix under unit plan and lesson plans)
<p>competencies:</p> <p>Culminating Activity: The final assessment will be the food web/chain posters of Cannon’s Point. The webs/chains will all be posted in the hallway to show them off. The papers as well will be a key part of the project. They are to include the interactions between the organisms at Cannon Point. The terminology used must include ecology terms that were found in the first two lessons leading up to the field trip. The groups will receive a grade as a whole and an individual grade based on their papers. Each member in the group will assess their contributions and the other member’s contributions that were in the group.</p>

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Unit Plan

Unit Information

1. **S7L4.** Students will examine the dependence of organisms on one another and their environments.
 - a) Demonstrate in a food web that matter is transferred from one organism to another and can recycle between organisms and their environments.
 - b) Explain in a food web that sunlight is the source of energy and that this energy moves from organism to organism.
 - c) Recognize that changes in environmental conditions can affect the survival of both individuals and entire species.
 - d) Categorize relationships between organisms that are competitive or mutually beneficial.

S7CS5. Students will use the ideas of system, model, change, and scale in exploring scientific and technological matters.

 - a) Observe and explain how parts can be related to other parts in a system such as predator/prey relationships in a community/ecosystem.

2. Essential Question(s)
 - 1) Explain the differences between a food chain and a food web.
 - 2) Where does all of the energy for all organisms come from?
 - 3) Why is each organism in an ecosystem important?
 - 4) What are the three types of relationships organisms have?

Lesson 1

1. **S7L4.** Students will examine the dependence of organisms on one another and their environments.
 - a) Demonstrate in a food web that matter is transferred from one organism to another and can recycle between organisms and their environments.
 - e) Explain in a food web that sunlight is the source of energy and that this energy moves from organism to organism.
 - f) Recognize that changes in environmental conditions can affect the survival of both individuals and entire species.
 - g) Categorize relationships between organisms that are competitive or mutually beneficial.

2. **Activities:** gain background knowledge on food chains by going over relevant vocabulary, introduction to food chains with a power point (see appendix), using knowledge just learned play a game on the web that matches the correct parts of a food web(<http://www.sheppardsoftware.com/content/animals/kidscorner/games/foodchaingame.htm>) split up class into two groups and give them time to think of how many plants, rabbits, and foxes will be needed for a particular food web to last 50 years, and a 3-2-1 summarizer.

3. **Lesson Assessment:** 3-2-1 Summarizer at the end of class. 3-Different ways organisms get energy 2-examples of consumers 1-the basis of ALL energy for ALL organisms is this:_____.

Lesson 2

1. **S7L4.** Students will examine the dependence of organisms on one another and their environments.
 - a) Demonstrate in a food web that matter is transferred from one organism to another and can recycle between organisms and their environments.
 - b) Explain in a food web that sunlight is the source of energy and that this energy moves from organism to organism.
 - c) Recognize that changes in environmental conditions can affect the survival of both individuals and entire species.
 - d) Categorize relationships between organisms that are competitive or mutually beneficial.
2. **Activities:** students will review the lesson from the previous day by doing a vocabulary activity in pairs, then students will be introduced to Cannon Point and the project based assessment that will follow the field trip and coached on what kind of questions to ask the tour guide that will be relevant to the project. Also during this lesson the students will be divided into groups of four. Each group will be assigned a camera to take with them during the tour of Cannon's Point. The goal is to take pictures of plants, animals, and anything else that may be in a food web. The pictures will be used to in a food web created by each group. Groups can also draw or print out the pictures for their food web of Cannon's Point.
3. **Lesson Assessment:** On a sheet of paper each group will develop 5-7 questions that they might ask the tour guide on the field trip to Cannon Point.

Lesson 3 (field trip)

1. **S7L4.** Students will examine the dependence of organisms on one another and their environments.
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 - b) Explain in a food web that sunlight is the source of energy and that this energy moves from organism to organism.
 - c) Recognize that changes in environmental conditions can affect the survival of both individuals and entire species.
 - d) Categorize relationships between organisms that are competitive or mutually beneficial.
- S7CS5.** Students will use the ideas of system, model, change, and scale in exploring scientific and technological matters.
 - a) Observe and explain how parts can be related to other parts in a system such as predator/prey relationships in a community/ecosystem.
2. **Activities:** students will actively participate during the field trip at Cannon Point by asking questions that they developed the previous day and taking pictures for their project. Students will be given a piece of paper for the questions they ask and answers they get and to also take notes with. This will be used to benefit them when making their food web and also with their report.
3. **Lesson Assessment:** the notes will be turned in with their final projects. This will be a resource for the students to use during the project. It will be graded for notes taken, questions asked, and for it being turned in on time.

Lesson 4-5

1. **S7L4.** Students will examine the dependence of organisms on one another and their environments.
 - a. Demonstrate in a food web that matter is transferred from one organism to another and can recycle between organisms and their environments.
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 - c. Recognize that changes in environmental conditions can affect the survival of both individuals and entire species.
 - d. Categorize relationships between organisms that are competitive or mutually beneficial.

S7CS5. Students will use the ideas of system, model, change, and scale in exploring scientific and technological matters.

- a. Observe and explain how parts can be related to other parts in a system such as predator/prey relationships in a community/ecosystem.
2. **Activities:** students will break off into their groups. One person from each group will go to the library and print off the pictures taken from the field trip for the food web. The other members will begin to construct the food web on poster board. Crayons, color pencils, and markers will be available to decorate the food webs. If groups need a picture they were unable to capture, they can either draw it or print one off the internet. Also the students will be working on their report papers. Everything is to be completed and turned on Friday during class.
3. **Lesson Assessment:** the groups will be assessed by how they use their time. Points will be deducted if they are wasting time or disrupting others.

Culminating Activity

Project: The final assessment will be the food web/chain posters of Cannon's Point. The webs/chains will all be posted in the hallway to show them off. The papers as well will be a key part of the project. They are to include the interactions between the organisms at Cannon Point. The terminology used must include ecology terms that were found in the first two lessons leading up to the field trip. The groups will receive a grade as a whole and an individual grade based on their papers. Each member in the group will assess their contributions and the other member's contributions that were in the group.



Cannon's Point Introduction

Context

- Describe the students' prior knowledge, the focus of the previous lesson, or how content connects to the real world
- Describe generally any critical student characteristics or attributes that will affect student learning

Name: Max Stieve	Date: Monday-Tuesday
Age/Grade Level: 7 th Grade	Number of Students:
Number of Students with IEP:	Number of Gifted Students:
English Language Learners:	Unit/Lesson Title: The Food Web
Math, Science, Social Science , Lang. Arts, Reading (Circle)	Lesson Length:

Learning Objectives(s)

S7L4. Students will examine the dependence of organisms on one another and their environments.

- k) Demonstrate in a food web that matter is transferred from one organism to another and can recycle between organisms and their environments.
- l) Explain in a food web that sunlight is the source of energy and that this energy moves from organism to organism.
- m) Recognize that changes in environmental conditions can affect the survival of both individuals and entire species.
- n) Categorize relationships between organisms that are competitive or mutually beneficial.

Essential Question(s)

- Explain the difference between a food chain and a feed web.
- Where does all of the energy for all organisms come from?
- Why is each organism in an ecosystem important?
- What are the three types of relationships that organisms have?

Resources, Media and Technology

- Smartboard
- Power Points: Energy
- <http://puzzling.caret.cam.ac.uk/game.php?game=foodchain>
- <http://www.youtube.com/watch?v=EK1PdYmkiAc>
- Vocabulary activity sheet

Procedures

Day 1:

- Background PowerPoint on energy and food web/chains. (25 minutes)
- Symbiosis BrainPop <http://www.brainpop.com/science/ecologyandbehavior/symbiosis/> (5 minutes)
- Game for matching up the correct parts of a food web
<http://www.sheppardsoftware.com/content/animals/kidscorner/games/foodchaingame.htm> (10 minutes)
- Split up the students into two groups. Students will list the number of plants, rabbits, and foxes that are needed for a particular food web to exist for 50 years. After the teams figure how much of each they want we will enter the numbers in the equation and see if the amounts will last 50 years.
<http://puzzling.caret.cam.ac.uk/game.php?game=foodchain> (15 minutes)
- 3-2-1 Summarizer at the end of class. 3-Different ways organisms get energy 2-examples of consumers 1-the basis of ALL energy for ALL organisms is this:_____ (10 minutes)

Day 2:

- Review of vocabulary from previous day. Do vocabulary activity, use desk partner and notes as references. (30 minutes)
- Introduce Cannon's point and project based assessment. <http://www.youtube.com/watch?v=EK1PdYmkiAc>

- Students will get into groups of four. Each group will be assigned a camera to take with them during the tour of Cannon's Point. The goal is for the groups to take pictures of plants, animals, and anything else that may be in a food web. The pictures will be used in a food web created by each group. Groups can also draw or print out the pictures for their food web of Cannon's Point. During the tour the students are encouraged to ask questions that pertain to the wildlife on the island. This information will be used for the individual aspect of the project. Students will write a brief one or two page report of the interactions that take place between the organisms on the land or wetlands. The report will include the content specific vocabulary that the students have learned from the food chains. (20 minutes)
- Ticket out the Door: On a sheet of paper each group will ask 5-7 questions that they might ask the tour guide on the field trip to Cannon Point. (10 minutes)

Informal Assessment

- The 3-2-1 will be looked over to check for accuracy and to base the following day's instruction.
 - The ticket out the door will be handed back to the groups the next day after suggestions are made on the questions to ask.
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Cannon's Point Field Trip

Questions to ask the tour guide (and the answers):

Notes for summary paper (be sure to look for interactions of organisms, the type of landscape, sunlight, etc.):

Rubric for Cannon Point Project: Name _____ Score _____

Category	3 Excellent	2 Good	1 Needs improvement
Food Chain or Web 20%	All links were in correct order in a manner that the chain was ecologically correct.	One link of the chain was out of order.	Two or more of the links of the chain were out of order.
Pictures/Drawings 20%	Pictures were used from Cannons Point or were found by other means.	One picture of the food chain was missing.	Two or more of the pictures of the food chain were missing.
Content of Poster 20%	All consumers and producers were named correctly or identified as being so. Poster is fully intact with nothing falling off.	Most of the consumers and producers were identified and the poster had one piece not intact.	Three or more of the consumer and producers were incorrectly identified and the poster had two or more pieces not intact.
Content of the Paper 20%	Paper correctly describes the interactions among the organisms at Cannon's Point in at least one page. All ecological terms necessary are used and used correctly.	Not the full length, some terms and interactions were not used or described correctly.	Paper is less than a half page. The terms required to be used are missing and the interactions of the organisms are incorrect.
Format of Paper 10%	Name, date, class, heading, no skipping lines and paragraphs indented. (Times New Roman, 1.5 lines, and 12 fonts if typed.)	Two of the elements are missing.	Four or more of the elements are missing.
Peer and Self-Assessment 10%	Grades will be averaged on the evaluation sheet and will be multiplied by .10 (%10).	Grades will be averaged on the evaluation sheet and will be multiplied by .10 (%10).	Grades will be averaged on the evaluation sheet and will be multiplied by .10 (%10).

PEER AND SELF EVALUATION RUBRIC FOR CANNON'S POINT

PROJECT TITLE: _____

GROUP MEMBERS: _____

Please rate your contribution to the group and evaluate the group on a scale from 1 – 10 with 10 being the highest.

INDIVIDUAL EVALUATION: Name _____

- ___ 1. Following teacher's instructions
- ___ 2. Asking meaningful questions
- ___ 3. Contributing ideas and information
- ___ 4. Helping the group stay on task
- ___ 5. Contributing materials
- ___ 6. Asking for help when needed
- ___ 7. Sharing responsibilities
- ___ 8. Respecting others
- ___ 9. Explaining things to others
- ___ 10. Doing things on time
- ___ 11. Doing my best

I could improve on _____

I rank my contributions to the group as _____ because _____

_____.

Directions: You are to cut out the words and definitions. Then you are to match each word with the correct definition. After you have done this with all the words raise your hand for the teacher to check to make sure it is right. Then proceed to glue the words and correct definitions side by side on a sheet of paper. The resources that you may use are your notes and table partner.

Herbivore	Kill for food, secondary or tertiary consumers
Carnivore	Struggle between organisms to survive as they attempt to use the same limited resource
Omnivore	One species is helped and the other is harmed Ex: dog (host) and flea (parasite)
Producer	An animal that eats both plants and animals
Primary Consumer	The relationship between organisms who hunt and kill for food and the animals who are hunted
Secondary Consumer	The organisms that predators feed on
Tertiary Consumer	Animals that eat secondary consumers (carnivores that feed on other carnivores)
Predators	Animals that only consume plant matter, they are herbivores
Prey	A network of interrelated food chains in a given area
Scavenger	The use of sunlight, carbon dioxide, and chlorophyll to make energy in the plant for

	the plan...how producers make their food
Decomposer	An animal that eats other plants
Trophic Level	Factors in an ecosystem or environment that affect the carrying capacity
Food Web	Each part of the food chain
Symbiosis	Where both species benefit from the relationship
Parasitism	Animals that eat primary consumers
Mutualism	One species benefits and the other is neither helped or harmed
Commensalism	An animal that eats plants
Competition	Relationship between two species where at least one benefits
Adaptation	Organism such as bacteria or fungi that breaks down dead organisms and their wastes
Photosynthesis	The perfect (optimum) number of a certain species an ecosystem can support
Predation	Usually a green plant the produces its own food by photosynthesis
Carrying Capacity	Change that helps an organism to survive in its environment

Limiting Factor	Consumer that eat dead animals
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