



Jupiter Inlet Lighthouse

Outstanding Natural Area

Hands on the Land Lesson Plan

Interdependence:
Producers, Consumers & Decomposers

7th Grade

Bureau of Land Management
Jupiter Inlet Lighthouse Outstanding Natural Area
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www.BLM.gov/jupiterONA

Lesson Plan

Course: 7th grade Science

Course Number: Big Idea 17 - Interdependence

Lesson Plan Date: March 2017

Lesson Title: Interdependence: Producers, Consumers and Decomposers

Time: 1 hour (in class) 2 (hours in field)

Instructor Preparation: (Prior to site visit)

Review Safety Precautions for ONA

Review Pre-Trip preparations

Pre-view field trip activities

Prepare students with vocabulary and knowledge of general land forms and geological processes.

Site Prep and Equipment:

a. For all field trips please check the Lighthouse and ONA websites at:

<http://www.jupiterlighthouse.org/plan/school-field-trips/>
www.BLM.gov/jupiterONA

b. **Activity overview:** Students will work in pairs making observations (or inferences) to identify producers, consumers and decomposers in the ONA and record their findings on a data sheet. Students will also observe, identify and describe examples of four ecological relationships among organisms on the ONA and identify the limiting factors for organisms of the ONA ecosystem.

c. Students should **define the Vocabulary** and have some knowledge of ecological processes and relationships prior to the site visit. The following web sites may be helpful with this preparation:

cpalms.org - [Lesson 45893](#) – PowerPoint covers ecology terminology, relationships, food web and food chain.

cpalms.org - [Video 128679](#) – Five-minute video discussing limiting factors.

d. **Make copies** of the data sheet and questions for each student.
Printing may be front and back.

e. **Preview** activity and data sheets with students and discuss safety requirements on the ONA.

Main Objective:

At the end of this lesson, students will be able to identify and describe examples of producers, consumers and decomposers as well as the main ecological relationships and limiting factors in a natural ecosystem.

| Est. Time | Visuals and Notes | Content |
|-----------|---|--|
| 20 min. | <p>Introduction: (Pre-Visit)</p> <p>Warm-up</p> <p>Possible PowerPoints to illustrate ecological concepts.</p> <p>cpalms.org - Lesson 45893</p> <p>cpalms.org-Lesson 127740</p> <p>cpalms.org-Lesson 154779</p> | <p>Discuss ecological relationships that occur in nature.</p> <p>Have students write down what they know regarding relationships in nature, predator/prey, food chains/webs and factors that limit organisms in a natural area.</p> <p>PowerPoints were developed and created by educators and provided on the Cpalms web site. Consider viewing all three and choose the best option for your students.</p> |
| 20 min | <p>Hook 1:</p> <p>See attached Vocabulary List</p> <p>See attached Vocabulary List Answers</p> | <p>Have students define vocabulary:</p> <p>Commensalism - A relationship between species that benefits one without significantly impacting the other.</p> <p>Competition - Organisms competing against each other for the same resources.</p> <p>Consumer - Any organism that must consume another organism (living or dead) to satisfy its energy needs.</p> <p>Decomposer - An organism that breaks down the tissue and or structures of dead organisms.</p> <p>Ecology - The study of the interactions between organisms and their environment.</p> <p>Ecosystem - A complex system of the interactions between all living things in a particular area.</p> <p>Energy transfer - The process where energy from the sun moves through the living organisms of an ecosystem.</p> <p>Food Chain - A simple and direct relationship where one organism is the food source for another organism.</p> <p>Food Web - A complex relationship among a group of organisms consisting of multiple food chains.</p> <p>Inference - A conclusion based on what one sees and already knows.</p> |

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|---------|---|---|
| | | <p>Limiting factor - Living or non-living parts of an ecosystem that impacts the number of organisms that can live in that ecosystem.</p> <p>Mutualism - A symbiotic relationship where both organisms benefit. Example: Pollinators & Flowers.</p> <p>Parasitism - A symbiotic relationship where one organism (the parasite) benefits and the other (the host) is harmed.</p> <p>Predation - A type of relationship where one organism (the predator) consumes all or part of another organism (the prey).</p> <p>Producer - A organism at the base of the food chain or web that obtains all its energy from the non-living environment.</p> <p>Symbiosis - An interaction between individuals of different species not including predator/prey relationships.</p> |
| 20 Min. | <p>Hook 2:</p> <p>See attached Natural Area Rules and Guidelines</p> <p>See attached How to Be a Great Chaperon.</p> | <p>Discuss and review ONA safety requirements and preview field study activity. Please visit web sites for additional information.</p> <ol style="list-style-type: none"> Stay with your Chaperone. Closed-toe shoes are required for all activities. (old tennis shoes work best for water shoes) Bring water, each student should have a water bottle! A floppy hat for shade may be helpful. Stay with partners/team/group (use the buddy system) Be careful of your surroundings: some plants are poisonous or have sharp thorns and some animals may be venomous. Don't touch anything you haven't been told to touch. Follow your group's protocol for emergencies. Report any injury or concern to site staff. |

| | | |
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| 2+ Hrs. | <p>Field Study Activity</p> <p>See attached Ecological Relationship Data Sheet</p> <p>See attached ONA Site Specific Ecological Reference Information</p> | <p>Our Main objective is that students will be able to identify and describe four ecological relationships, understand energy transfer through an ecosystem relating to food chains and webs and determine Limiting Factors in an ecosystem.</p> <p>Students will work in pairs, and stay within sight of their assigned chaperon while on the ONA. Each pair of students will need a clipboard and a pencil. A camera is optional. As the students tour the site, they are to observe the ecological relationships occurring on or around the site and record</p> |
|---------|---|---|

| | | |
|---------|---|--|
| | | those observations on their Data Sheet. If they have cameras, students should take a photo of their observations to support the data on their sheets. |
| 30 Min. | See attached Follow-up Questions and ONA Site Specific Ecological Reference Information | After the walk on the site, students will return to the designated location and discuss their findings. Students will individually complete the follow-up questions. |

Helpful web sites:

[cpalms.org - Lesson 45893](http://cpalms.org) – PowerPoint (16 slides) under “Teaching Phase” section, covers

ecology terminology, relationships, food web and food chain.

[pbslearningmedia.org - Decomposer video](http://pbslearningmedia.org) – 3-minute video on Decomposers

[cpalms.org - Lesson 30582](http://cpalms.org) – PowerPoint (22 slides) under “Attachments” – Covers Producers,

consumers, decomposers and energy transfer. Also, has activities

embedded in PowerPoint.

[http://www.learner.org - Ecology](http://www.learner.org) – Information on ecosystems and energy flow

[cpalms.org-Lesson 127740](http://cpalms.org) – PowerPoint (21 slides) under “Attachments” - Covers producers,

consumers and decomposers along with food webs and chains.

[cpalms.org - Video 128679](http://cpalms.org) – Five-minute video discussing limiting factors in an ecosystem.

[cpalms.org - Lesson 44964](http://cpalms.org) - Learning Interdependence Through Florida's Ecosystems

[cpalms.org-Lesson 154779](http://cpalms.org) – High School lesson (14 slides) Ecological concepts covered.

Grade 7 Benchmarks:

Big Idea 17: Interdependence

A. Plants and animals, including humans, interact with and depend upon each other and their environment to satisfy their basic needs.

B. Both human activities and natural events can have major impacts on the environment.

C. Energy flows from the sun through producers to consumers.

| | |
|--------------------|---|
| SC.7.L.17.1 | Explain and illustrate the roles of and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web. <i>Cognitive Complexity:</i> Level 3: Strategic Thinking & Complex Reasoning |
| SC.7.L.17.2 | Compare and contrast the relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism. <i>Cognitive Complexity:</i> Level 2: Basic Application of Skills & Concepts |
| SC.7.L.17.3 | Describe and investigate various limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites. <i>Cognitive Complexity:</i> Level 3: Strategic Thinking & Complex Reasoning |

Access Point for Students with Significant Cognitive Disabilities

| Independent | Supported | Participatory |
|---|--|---|
| <p>SC.7.L.17.In.1 Identify that in a simple food chain, energy transfers from the Sun to plants (producers), to animals (consumers), and to organisms that cause decay (decomposers). <u>Date Adopted or Revised:</u> 02/08</p> <p>SC.7.L.17.In.2 Describe how organisms interact with other organisms in an ecosystem to help each other (mutualism), to obtain food (predation), and to benefit at the expense of the other (parasitism). <u>Date Adopted or Revised:</u> 02/08</p> <p>SC.7.L.17.In.3 Recognize that living things compete with each other to get the things they need to live in their local environment. <u>Date Adopted or Revised:</u> 02/08</p> | <p>SC.7.L.17.Su.1 Identify different types of consumers in a food chain, including animals that eat plants, animals that eat other animals, and animals that eat plants and animals. <u>Date Adopted or Revised:</u> 02/08</p> <p>SC.7.L.17.Su.2 Recognize how living things affect each other in their habitat (ecosystem). <u>Date Adopted or Revised:</u> 02/08</p> <p>SC.7.L.17.Su.3 Identify how a lack of food, water, or shelter affects plants and animals in their habitats. <u>Date Adopted or Revised:</u> 02/08</p> | <p>SC.7.L.17.Pa.1 Recognize that humans eat vegetables and fruits (plants) and meat (animals). <u>Date Adopted or Revised:</u> 02/08</p> <p>SC.7.L.17.Pa.2 Recognize a mutual relationship between people and other living things. <u>Date Adopted or Revised:</u> 02/08</p> <p>SC.7.L.17.Pa.3 Recognize what happens when animals don't get food and water. <u>Date Adopted or Revised:</u> 02/08</p> |

Vocabulary List

Vocabulary (7th Grade):

Commensalism -

Competition -

Consumer -

Decomposer -

Ecology -

Ecosystem -

Energy transfer -

Food Chain -

Food Web -

Inference -

Limiting factor -

Mutualism -

Parasitism -

Predation -

Producer -

Symbiosis -

Vocabulary List Answers

7th Grade Vocabulary Answers:

Commensalism - A relationship between species that benefits one without significantly impacting the other.

Competition - Organisms competing against each other for the same resources.

Consumer - Any organism that must consume another organism (living or dead) to satisfy its energy needs.

Decomposer - An organism that breaks down the tissue and or structures of dead organisms.

Ecology - The study of the interactions between organisms and their environment.

Ecosystem - A complex system of the interactions between all living things in a particular area.

Energy transfer - The process where energy from the sun moves through the living organisms of an ecosystem.

Food Chain - A simple and direct relationship where one organism is the food source for another organism.

Food Web - A complex relationship among a group of organisms consisting of multiple food chains.

Inference - A conclusion based on what one sees and already knows.

Limiting factor - Living or non-living parts of an ecosystem that impacts the number of organisms that can live in that ecosystem.

Mutualism - A symbiotic relationship where both organisms benefit. Example: Pollinators & Flowers.

Parasitism - A symbiotic relationship where one organism (the parasite) benefits and the other (the host) is harmed.

Predation - A type of relationship where one organism (the predator) consumes all or part of another organism (the prey).

Producer - A organism at the base of the food chain or web that obtains all its energy from the non-living environment.

Symbiosis - An interaction between individuals of different species not including predator/prey relationships.

Follow-Up Questions

Follow-up Questions for grade 7 on the Outstanding Natural Area (ONA):

1. Using the list of producers, consumers and decomposers on your Data Sheet, draw a small food web (you can use words or drawings) and indicate the direction of energy flow.

2. Select one limiting factor you determined exists in the ONA and explain how that limiting factor could be improved upon.

3. Describe one example of “Competition” you observed on the ONA and offer possible solutions to reduce that competition.

4. List one of each of the following ecological relationships that **could** be on the ONA:
Commensalism –

Mutualism –

Parasitism –

Predation –

ONA Site Specific Ecological Reference Information

While many ecological relationships may be observed in any ecosystem, each individual ecosystem has site specific relationships and interactions. Below are relationships and interactions that are on (not all are visible) the ONA and may be possible answers from students on their data sheets. Generally, in all ecosystems, green plants are producers, animals are consumers and bacteria and fungi are decomposers. Listed below are some specific to the site organisms. Others are possible.

| Producers | Consumers | Decomposers |
|---------------------|----------------------|----------------|
| Algae | Various Bird species | Mushrooms |
| Mosses | Gopher Tortoise | Earthstars |
| Prickly Pear Cactus | Raccoons | Lichens |
| Scrub live oak | Opossums | Earthworms |
| Palmetto | Squirrels | some Insects |
| Sea Grape | Lizards | Shrimp |
| Sand Pine Trees | Snakes | Oysters |
| Grasses | Humans | Snails & Slugs |

Possible, observable, relationships on the ONA are as follows: (others certainly exist)

| Commensalism | Mutualism | Parasitism |
|--|---|--|
| Bromeliads (air plants, Spanish moss, ball moss) attached to trees. | Lichens themselves are some combination of algae, fungi & bacteria. | Old Strangler fig (parasite) growing around and choking out Cabbage Palm trees (host). |
| Red Mangroves growing on shoreline providing habitat for small fish. | Bees or other insects gather nectar and pollinate plants. | Love vine/Dodder (parasite) growing on scrub oak (host). |
| Snakes, lizards, mice, toads living in Gopher tortoise burrows. | Birds & other animals eating seeds or fruit and spreading seeds. | Ticks or mosquitos (parasite) taking blood from animal hosts and causing illness. |
| Predation | Limiting factors on the ONA: | |
| Osprey or Pelicans (predators) eating fish (prey). OR other birds eating insects. | The ONA has a number of limiting factors that are common any habitat, however, some factors are magnified due to the location of the ONA. The limiting factor most affecting the ONA is SPACE ; the site is on about 50+ acres, and is locked between two roads, two rivers and home sites. Another limiting factor is FRESH WATER ; there is no natural fresh water on the ONA, only rainfall that may be trapped in vegetation. FOOD ; due to space, there is limited food for predators with the exception of marine prey. FIRE , Sand pine scrub needs fire on a 20-80-year cycle to maintain healthy Scrub habitat, HUMAN ACTIVITY , may also be considered a limiting factor as humans cause a number of impacts to the ONA. | |
| Reptiles [Snakes, Lizards, Frogs, Toads (predators)] eating insects or other animals (prey). | | |
| Raccoons or other mammals (predators) eating fish or other organisms (prey). | | |

Competition on the ONA: Animals compete for food sources against each other and exotic species, plants compete for space (sunlight & rainfall) among native and exotic species, insects and small animals compete for hiding space, and humans compete for recreational use.

Ecological Relationship Data Sheet

Name: _____

Date: _____

Time: _____

Find and record evidence of each of the following ecological relationships. ***Indicate** in the box, if you actually observed the relationship or if you made an inference based on your observations.

| Observation 1 | Commensalism One benefits with no impact to the other. | Mutualism Both organisms benefit. | Parasitism One benefits the other is harmed. | Predation One organism eats part or all of the other. |
|----------------------------------|--|---|--|---|
| Identify the related organisms ⇨ | | | Host: | Predator: |
| | | | Parasite: | Prey: |
| Description of relationship ⇨ | | | | |
| *Inference or Observation?⇨ | | | | |

| Observation 2 (Optional) | Commensalism One benefits with no impact to the other. | Mutualism Both organisms benefit. | Parasitism One benefits the other is harmed. | Predation One organism eats part or all of the other. |
|----------------------------------|--|---|--|---|
| Identify the related organisms ⇨ | | | Host: | Predator: |
| | | | Parasite: | Prey: |
| Description of relationship ⇨ | | | | |
| *Inference or Observation?⇨ | | | | |

Below, identify and list four organisms that you observed for each category:

| | | | | |
|--------------------|--|--|--|--|
| Producers | | | | |
| Consumers | | | | |
| Decomposers | | | | |

Below, identify and list four limiting factors of the ONA.

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|-------------------------|--|--|--|--|
| Limiting Factors | | | | |
|-------------------------|--|--|--|--|

Natural Area Rules and Guidelines:

The Natural Area is Federal property and is regulated by Federal, State and local laws. Complete and detailed regulations regarding the Jupiter Inlet Lighthouse Outstanding Natural Area (ONA) are available in the *Jupiter Inlet Outstanding Lighthouse Natural Area Comprehensive Management Plan and Environmental Assessment* (pages 137-149) available at the following website:

https://www.blm.gov/style/medialib/blm/es/jackson_field_office/jupiter_ona/ONA_plan/jupiter_plan.Par.11697.File.dat/Jupiter%20Inlet.pdf

General Rules and Guideline Requirements:

1. All groups or individuals **MUST** contact the site manager (Peter DeWitt, Site Manager Jupiter Inlet Lighthouse ONA, Bureau of Land Management, 600 State Road 707, Unit B Jupiter, FL 33469. Phone: (601) 331-7407) **prior to starting** any field study or research activities on the site to obtain special permits for field work.
2. **Do not collect anything.** Collection of any item, living or non-living is **not allowed without special permit from the site manager.**
3. **No digging.** This site is a historical site with cultural significance, it is protected by law.
4. **Stay on the concrete trail and boardwalk.** Endangered and sensitive plants are on the site.
5. **No pets are allowed** in the natural area.
6. **No swimming.** Wading may be permitted for specific field study activities.
7. **Closed-toe shoes are required** for all activities on site.
8. Be familiar with the local plants and animals both terrestrial and marine. There are poison plants and may be venomous animals on the ONA site.

Helpful websites:

Marine organisms: http://www.floridahealth.gov/diseases-and-conditions/food-and-waterborne-disease/_documents/stings.pdf

Plants: <http://www.edis.ifas.ufl.edu/pdffiles/EP/EP22000.pdf>

Snakes: http://ufwildlife.ifas.ufl.edu/venomous_snake_identification.shtml

Insects: <http://edis.ifas.ufl.edu/ig099>

9. **Be respectful of both other visitors and the environment while visiting the natural area.**
10. **Park only in designated areas.**
11. **Emergency – follow group protocol or call 911. Report all injuries, issues or concerns to the site manager.**

How to be a Great Chaperone

You don't need special knowledge to be a chaperone—just common sense and a willingness to jump in and get involved. Here are a few tips to help make your trip a good one:

What will I be doing as a chaperone?

You will supervise a small group of students, help them learn, assist the ranger when called upon, and make sure the students behave appropriately.

What will my role be during the program?

Throughout the visit, your job will be to monitor the behavior of the students, provide for their safety, and facilitate the learning process while insuring a fun visit for the students. You may be asked to work with specific students and help guide them through program activities. You may want to ask the teacher for information about the program, including background information and vocabulary words, to familiarize yourself with the topic. The more you can interact with the students, the better their experience will be.

What do I need to tell the students about touching things?

Encourage students to touch gently when instructed to do so. When touching marine animals, wet your hands in seawater first. Most marine animals have a coating of slime to protect them. Touching them with a dry hand can damage their slime layer and harm their delicate surfaces.

- Do not pick up or remove the animals.
- Follow the guidance of the education staff.

How can I help students get the most out of their visit?

- Be sure you understand the plan for the day, as instructed by the student's teacher.
- Ask the teacher for any material that will help you lead the students.
- Ask the teacher whether the students have specific projects to work on, and how you can help them during the visit.
- Interact and have fun with the students.
- Ask questions of each student in your group. There will always be a few who have all the answers.
- Encourage the shy or quiet students to share ideas, too.

What else do I need to know?

- Please leave small children at home if possible. They distract you from your duties as a chaperone.
- Avoid visiting with other adults at the expense of your chaperone duties. Remember that your primary job is to chaperone the students, not to visit with other parents.
- Students must stay with you, their chaperone, always. Their behavior is your responsibility.
- Be sure you know when and where to meet the rest of your group during and at the end of the visit.