

<b>Lesson Title</b>	Should Populations in an Ecosystem be Restricted?
<b>Grade Level</b>	4 <sup>th</sup> grade
<b>Content Area</b>	Science
<b>Time Allotment</b>	2 weeks
<b>Academic Standards Addressed</b>	New Jersey Core Curriculum Content Standards (NJCCCS) <ul style="list-style-type: none"> <li>• 5.1</li> <li>• 5.10A</li> <li>• 5.10B</li> </ul>
<b>Abstract</b>	The students will learn about the meaning of the word ecosystems. The students will then collect data to answer the question, “Should Populations in an Ecosystem be Restricted?” The students are going to engage in a hands on science experiment in order to answer the questions. The students will follow the Scientific Method by making a hypothesis, recording observable data, analyzing results and coming to a conclusion.
<b>Goal</b>	Students will be able... <ul style="list-style-type: none"> <li>• To gain an understanding of an ecosystem (both biotic and abiotic factors).</li> <li>• To learn some of the harmful effects of overpopulation on an ecosystem.</li> <li>• To accurately take measurements on both standard and metric length measurements.</li> </ul>
<b>Background Information</b>	Students will need to have a basic working knowledge of the definition of an ecosystem.
<b>Materials</b>	The picture book, “Ecosystems” by Claire Daniel, United Streaming Video access, a computer, an mp3 player, the song sheet for “Ecosystems Song”, the lab evaluation form rubric, 2 small milk cartons, 1 nail, garden soil, water, bean seeds, standard and metric ruler, marker.pie pan, measuring cup
<b>Technology</b>	<ul style="list-style-type: none"> <li>• Computer to show the United Streaming Video</li> <li>• MP3 player to play the “Ecosystems Song”</li> </ul>
<b>Instructional Procedure</b>	<p>1)The students will be introduced to ecosystems through the picture book, “Ecosystems” by Claire Daniel. The introduction will be expanded through the students viewing the United Streaming Video, “Elements of Biology: Ecosystems: Organisms and Their Environment”. The students will further learn about ecosystems through the “Ecosystem Song” included below.</p> <p>2) The students will conduct the experiment.</p> <ul style="list-style-type: none"> <li>• The students will record their hypothesis in their journal stating what they think will happen to the two different pie pans of plants.</li> <li>• The students will follow the experiment procedure. They will first cut off the top of each carton. Punch three small holes (use the nail) into the bottom of each carton.</li> </ul>

	<ul style="list-style-type: none"> <li>• Use the marker to label the cartons "A" and "B".</li> <li>• Fill each carton 3/4 full with garden soil. Do not pack in the soil.</li> <li>• In carton "A", plant three bean seeds about one centimeter apart. In carton "B", plant 20 bean seeds about 1/2 centimeter apart.</li> <li>• Place both cartons in the pie pan. Water each carton with about 1/4 cup of water. Water each carton every 3-4 days. Keep the soil damp, but not soaked.</li> </ul> <p>3) The students will observe the plants in each carton after one week and again a week later. They will measure the growth using a standard length ruler. They will record this information in their observation journal. They will also create drawings of their observations in their journal.</p> <p>4) Upon completion of the experiment the students will analyze their data through the "Journal Entry Questions for Analyzing Data".</p> <p>5) The students will then write a conclusion paragraph. In the conclusion paragraph the students should include whether their hypothesis was proved correct or incorrect and why? They should then answer the question based on their conclusion, "Should populations in an ecosystem be restricted?"</p> <p>6) Once the students have completed their lab reports, they will self assess themselves on the rubric before submitting to the teacher.</p> <p>7) Have students discuss their findings by pair/sharing. Select students to share out whole class.</p>
<b>Assessment</b>	The students will be given clear expectations, following a backwards design. The students will be provided with the rubric at the start of the lesson, entitled: Lab Report Evaluation Form Rubric. (Please see below)
<b>Connection to Other Content Areas</b>	<p><b>Language Arts-</b> The students will have to write journal entries of their observational data. The students will also have to answer specific journal questions in order to help them analyze the data and make conclusions.</p> <p><b>Mathematics-</b> The students will have to use a metric ruler to plant the seeds the appropriate spacing apart. The students will have to use a standard ruler to measure the daily growth of the plants. The students will have to make a graph indicating the plant growth over time.</p>
<b>Extensions</b>	The students will see the PowerPoint Slide Show of the expedition, "Wild Horses of the Outer Banks". Using their prior knowledge, they will identify the biotic and abiotic factors in the ecosystem on Shackleford Banks. Ask the students to discuss what kinds of problems could ensue based on an overpopulation of the biotic factor: the horses. Explain to the students the steps that are being taken to manage the herd size.
<b>Acknowledgements</b>	www.unitedstreaming.com; "Ecosystems" by Claire Daniel; "Ecosystems Song" by Science Mania cs; Lab report Rubric generated by www.teach_nology.com

Lesson Submitted by: Mindy Shulman



# Ecosystems Song

By, Science Maniacs

(Chorus)

I've got a big pond in my backyard  
It's my own little ecosystem working hard  
All the organisms are part of the food web  
They play specific roles to make sure that they all get fed  
The grasses growing on the edge and the algae in the water  
The producers photosynthesize with light, CO<sub>2</sub> and water  
CO<sub>2</sub> is in the air, the light comes from the sun  
They produce the oxygen and the food needed by everyone

(Chorus)

Some snails eat the algae and some snails eat the grass  
They're the primary consumers 'cause they eat only plants  
And even when the grass has died there's still some energy left  
For the decomposers, dead things are what they like best

(Chorus)

The fish eat the snails and the turtles eat the fish  
And every time that one of them eats it only gets 10%  
So every gram of turtle needs 10 grams of fish  
A gram of fish needs 10 grams of snails to fulfill its energy requirements

(Chorus)

An ecosystem relies upon this energy pyramid  
It takes an awful lot of plants to let 1 turtle live  
1000 plants, 100 snails, 10 fish would be just right  
To keep 1 turtle well fed and it all starts out with light.

## Lab Report Evaluation Form

A completed Lab Report should include the following sections:

Heading, Title, Problem, Hypothesis, Materials, Procedures, Data, Conclusion, and Conclusion Questions.



This Lab Report Is Completed To The Best Of My Ability.

X \_\_\_\_\_

(Student Signature)

Name: \_\_\_\_\_

Teacher: Mrs. Schulman

Title of Experiment: \_\_\_\_\_

Date Submitted: \_\_\_\_\_

Lab Partner: \_\_\_\_\_

<u>Teacher</u>	<u>Criteria</u>	<u>Student</u>
0, 5, 10	Clear and Appropriate HEADING, TITLE, PROBLEM, and HYPOTHESIS.	0, 5, 10
0, 5, 10	All MATERIALS listed and a summary of PROCEDURE.	0, 5, 10
0, 10, 20	Appropriate presentation of DATA and observations including graph(s), drawing(s), etc. Accuracy of data.	0, 10, 20
0, 10, 30, 50	Clear and concise CONCLUSIONS. Conclusion addresses problem and states knowledge gained. Answers to all QUESTIONS.	0, 10, 30, 50
0, 5, 10	Overall- NEATNESS, GRAMMAR, adheres to FORMAT, etc.	0, 5, 10
_____	<-----Total points earned = Lab grade----->	_____

Teacher Comments:

## Journal Entry Questions for Analyzing Data:

1. In which carton were the plants taller?
2. In which carton were the plants fuller?
3. In which carton were the plants more crowded?
4. What might have caused the difference in the way the plants grew?
5. What might happen to the soil when the plant population becomes too dense?
6. Do you think overcrowding might cause similar problems in other populations?
7. What problems can you think of that might happen in other overcrowded population?

Please see scanned documents (in separate email) which include:

- Two press release articles to both The Eagle and the Star Ledger
- Transportation receipts: the e-ticket and the credit card transaction  
**\*\* Please note:** Please send the travel reimbursement to my new address at:  
5 Martindale Road, Short Hills, NJ 07078 Thank you!