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**We’re All in this Together**

**Everything in our world is connected.**

**A study of the Lake Champlain Basin Ecosystem**

**Created by Heather Estey and Rebecca Zavadil**

**July 2011**

**“We’re All In This Together”**

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**UNIT PLAN**

**Unit Title**: We’re All in this Together

**Creator**: Rebecca Zavadil and Heather Estey, Bristol Elementary School

**Topic**: Ecosystems

**Grade levels**: 5 and 6

**Content Areas**: Science, Social Studies, Language Arts

**Approximate Duration**: 15 weeks (twice a week for 50 minutes)

**Enduring Understanding**: Everything in our world is interdependent.

**Essential Questions**:

What are the connections among living and non-living things within and across systems?

Why should we take care of the world around us?

**Unit Overview**: In this unit, students explore the interconnectedness within ecosystems. They will learn about how energy is transferred within an ecosystem, how an ecosystem is balanced and self-sustaining. Students will simulate food webs in class, create their own ecosystems in a bottle, and conduct experiments examining what happens when equilibrium is disrupted. Students will then apply their understanding of ecosystems in a self-designed project investigating a problem in the Lake Champlain Basin ecosystem and propose solutions.

This unit will be taught primarily by the science/technology and word study teachers, with support from the reading, writing and social studies teachers. Students will focus on the science concepts around ecosystems in that class, with major support around vocabulary occurring during word study class. Lessons for both these classes are included in this unit plan. Social Studies classes will be focusing on social sciences topics in the context of the Lake Champlain Basin (geography, history, human impact). Reading and Writing class lessons will support research and presentation skills that students will need for the summative assessment project.

**Learning Goals**

**Vermont Standards and Grade Expectations Assessed:**

**S5-6:36 Students demonstrate their understanding of Equilibrium in an Ecosystem by...**

Experimenting with a closed system and drawing conclusions about how an environmental change affects the system (e.g., bottle biology).

Science Concept:  
a. The number of organisms an ecosystem can support depends on the kinds of organisms present and the availability of biotic and abiotic resources (i.e., quantity of light and water, range of temperatures, and soil composition).

**H & SS 5-6:14 Students act as citizens by…**

Identifying problems and proposing solutions in the local community, state, nation, or world.

**R6: 5 Identifies the meaning of unfamiliar words by…**

• Using strategies to unlock meaning (e.g., knowledge of word structure, including prefixes/suffixes and base words; or context clues; or other resources, such as dictionaries, glossaries, thesauruses; or prior knowledge) R–6–2.1

**R6: 6 Shows breadth of vocabulary knowledge through demonstrating understanding of word meanings or relationships by…**

• Selecting appropriate words or explaining the use of words in context, including content-specific vocabulary, words with multiple meanings, or precise vocabulary R–6–3.2

**TGE Grade 3-5 Critical Thinking, Problem Solving, & Decision Making**

Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

* Students use a variety of digital tools and resources to identify a school, local, or state issue, create a problem statement, and generate questions for investigation**.**
* Students use a variety of digital tools and resources, selected by the teacher, and resources to explore problems by collecting information from sources with diverse perspectives, summarizing the results, and proposing multiple solutions.

**KUDs**:

Students will **know**:

* An ecosystem is a community of living and non-living things that work together.
* Energy is transferred to all living things in an ecosystem- a food web shows how energy is transferred (energy flow and food webs).
* When one part of an ecosystem is impacted it has an effect on the entire ecosystem- (equilibrium).
* Ecosystems face complex problems that affect air quality, water quality, food availability, and the survival of native species. Most of these problems stem from human impact.
* We have the power to instigate change in our local environment by raising awareness through digital and personal contact, psa’s, and talking with the government.
* Using the vocabulary of ecosystems allows scientists to share important ideas -

Vocabulary words: ecology, environment, biodiversity community, equilibrium, ecosystem, watershed, habitat, biotic, abiotic, biome, biosphere, herbivore, carnivore, omnivore, decomposers, consumers, producers, niche, organisms, species, native, invasive, terrestrial, marine

* Inquiry skills: designing questions, developing a hypothesis, observing, concluding

Students will **understand**:

* Everything in our natural world is connected
* Humans have a responsibility to take care of the natural world around them.
* We depend on oral and written language to understand and communicate important ideas and learn from each other.
* There are certain steps to take in all inquiry

Students will **be able to**:

* Explain how energy is transferred within an ecosystem.
* Analyze the effects when a piece of the system is broken (Equilibrium, native and non-native species).
* Identify problems that ecosystems face.
* Explain how these problems disrupt ecosystems.
* Explore and/or suggest possible solutions to problems that ecosystems face.
* Persuade an audience that these problems are significant and require action from the local community.
* Use ecosystems vocabulary appropriately to communicate a message.
* Conduct inquiry project on issues in the Lake Champlain Basin ecosystem.

**Prerequisite Considerations:**

|  |  |  |  |
| --- | --- | --- | --- |
| **What skills do they need to have for the summative?** | **How will I know that they have these skills?**  **Pre- and formative assessment** | **How will they learn these skills if they don’t already have them?** | **When and Where?** |
| Know the meaning of ecosystems vocabulary (ecology, environment, biodiversity community, equilibrium, ecosystem, watershed, habitat, biotic, abiotic, biome, biosphere, herbivore, carnivore, omnivore, decomposers, consumers, producers, niche, organisms, species, native, invasive, terrestrial, marine) | Word Study: Vocabulary Knowledge Rating activity | Multiple whole and small group vocabulary lessons during the unit to include concept maps, semantic maps, semantic feature analysis, etymology and morphology activities. | during unit (Word Study class) |
| Choose appropriate vocabulary to persuade an audience | Writing class | Writing teacher will be doing mini-lessons on persuasive writing and elements of a persuasive argument. Students will be practicing writing persuasive pieces. | during unit (Writing class) |
| How to conduct research? Asking good research questions. | Ask students to brainstorm research questions independently (or in small group). | As a whole group come back and share out ideas. Continue to ask students probing questions as they conduct research. | during unit (Science/Tech class) |
| How to use email/Google survey | Email all students and have them respond back to me. Send them survey and have them complete it. | Have 6th grade experts guide students in how to email and take surveys. Provide a “tech” partner. | prior to and during unit (Science/Tech Class) |
| Variety of presentation tools (Prezi, VoiceThread, PowerPoint, MovieMaker, Audacity, Glogster) | all 6th graders know these...have 6th graders conduct stations and teach 5th graders. | Have students link up with a “tech partner” that can help them with these tools. | prior to and during unit (Science/Tech Class) |
| How to organize research | Ongoing observation | provide note-taking organizers as options for groups to use | during unit (Reading, Social Studies, and Science class) |
| Digital citizenship | 6th grade knows these concepts, 5th grade needs teaching | Have small lesson stations where 6th graders lead activities involving digital citizenship (these lessons will come prior to Ecosystems unit) | prior to unit (Science/Tech Class) |
| Cooperative group skills | Broken circles activity (prior to ecosystems unit) | create list of group work expectations and post in class for the year/always go back to it. | prior to unit (all classes) |
| Evaluate the reliability of online information | Give them a fake website and ask students what they notice, critique it. | Students will keep a list of resources | Kyra (media specialist) |
| Interview skills | Students independently (or in small group) prepare questions for interviewing a scientist. | Share out ideas as a whole group. | during unit (science/tech class) |
| Content knowledge - characteristics of an ecosystem: equilibrium, energy flow | See Ecosystems pre-assessment and lesson plans, Word Study ecosystems concept map | pre-assessment and Exit Cards/ ongoing small group mini-lessons to help those that are struggling. Provide videos, images and discussions to supplement lesson plans. | during unit (Science/Tech Class) |
| Characteristics of informational text | Reading class | Reading teacher will be working with students on exploring informational texts through a biography unit. Supplemental reading teachers will support students in this as well. | prior to and during unit (Reading Class) |
| How to synthesize information | Reading and writing classes | Reading and Writing teachers will work with students on exploring informational texts and taking notes and summarizing the information found. | prior to and during unit (Reading Class) |
| Inquiry Skills (bottle ecology) Scientific Method | Do a simple experiment at beginning of the year that requires students to use the scientific method. (this will happen prior to ecosystems unit) | Provide a sheet of paper that has a list and description of the scientific method that students can use during this unit. Exit cards asking them how they might tweak or extend the experiments that they are conducting. | prior to and during unit (Science/Tech Class) |

**Culminating Summative Performance Task:** Students will identify a problem that the Lake Champlain Basin ecosystem faces. They will explain how this problem disrupts the equilibrium of the Lake Champlain Basin ecosystem, explore solutions that have already been implemented and, if applicable, suggest new solutions. Finally, they’ll persuade an audience that this problem is significant and teach ways to take action.

**Links and Resources:**

<http://magma.nationalgeographic.com/ngexplorer/0403/quickflicks/>

[ECHO Lake Aquarium and Science Center](http://www.echovermont.org/index.html)

[Lake Champlain Basin Program](http://www.lcbp.org/)

UVM Watershed Alliance

<http://www.nhptv.org/natureworks/nwepecosystems.htm>

[http://www.uvm.edu/~watershd/](http://www.uvm.edu/%7Ewatershd/)

[http://www.lakechamplaincommittee.org/about-lcc/history/](http://www.google.com/url?q=http%3A%2F%2Fwww.lakechamplaincommittee.org%2Fabout-lcc%2Fhistory%2F&sa=D&sntz=1&usg=AFQjCNGn-aQDpltnlPUB_aHuZNImgFI8MQ)

<http://www.sheppardsoftware.com/content/animals/kidscorner/foodchain/foodchain.htm> - food chain game

<http://www.ecokids.ca/pub/eco_info/topics/frogs/chain_reaction/index.cfm>

<http://www.quia.com/custom/515main.html>

<http://www.neok12.com/Ecosystems.htm>

Demarest, Amy, This Lake Alive: An Interdisciplinary Handbook for Teaching and Learning about the Lake Champlain Basin, Shelburne Farms, 1997.

Kids Discover, Ecology, February 2002, Kids Discover.

Kids Discover, Lakes, April 2003, Kids Discover.

Kids Discover, Oceans II, January 1997, Kids Discover.

Kids Discover, Rivers, December 1993, Kids Discover.

Kids Discover, Wetlands, December 1997, Kids Discover.

**Word Study resources**  
Bear, Donald R., Invernizzi, Marcia, Templeton, Shane, Johnston, Francine, Words Their Way: Word Study for Phonics, Vocabulary and Spelling Instruction, Pearson Education, 2012.

Blachowicz, Camille and Fisher, Peter J., Teaching Vocabulary in All Classrooms, Pearson Education, 2006.

Ganske, Kathy, Mindful of Words: Spelling and Vocabulary Explorations 4-8, The Guilford Press, 2008.

Johnson, Sandy, Take It To Your Seat Vocabulary Centers: Grades 5-6, Evan-Moor Educational Publishers.

**SUMMATIVE ASSESSMENT PLAN**

**Assessment Title**: Lake Champlain Ecology Project

**Name of Corresponding Unit**: We’re All in this Together

**Content Areas**: Science, Social Studies, Language Arts

**Creators:** Rebecca Zavadil and Heather Estey, Bristol Elementary School

**Grade levels**: 5 and 6

**Recommended Duration**: 6 weeks (2 X week)

**Vermont Standards and Grade Expectations Addressed**:

**S5-6:36 Students demonstrate their understanding of Equilibrium in an Ecosystem by...**

Experimenting with a closed system and drawing conclusions about how an environmental change affects the system (e.g., bottle biology).

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* Students use a variety of digital tools and resources, selected by the teacher, and resources to explore problems by collecting information from sources with diverse perspectives, summarizing the results, and proposing multiple solutions.

**Assessment Overview**:

Students will identify a problem that the Lake Champlain Basin ecosystem faces. They will research this problem. They will explain how this problem disrupts the equilibrium of the Lake Champlain Basin ecosystem, explore solutions that have already been implemented and, if applicable, suggest new solutions. Finally, they’ll persuade an audience that this problem is significant and suggest ways to take action.

**Description**:

Students will choose from a posted list (or suggest their own) several environmental problems affecting the Lake Champlain Basin that they want to research (e.g water quality, air quality, invasive species, soil quality). Based on the choices identified in the classroom, students will be formed into small groups based on similar interests. Within their group, students will research the problem (Perhaps each in the group choose a specific problem within the general topic?). Research will be conducted using a variety of resources including books, guides, pamphlets, along with websites and email with experts from ECHO, LCBP, and the UVM Watershed Alliance. They will design a Google Form to send out to the Bristol community and school members via Front Porch Forum and the *Addison Independent* to survey what people already know about the issue and what they don’t. This will help guide their presentation and think about authentic audience. Those who respond to the survey will be invited to our school’s Lake Day where the students will present their findings.

They’ll explain how their problem affects the Lake Champlain Basin ecosystem. (Why is this a problem? What are the causes and effects? How does it affect energy flow and the equilibrium?) They will have the option of collaborating and sharing notes as a group using Google Docs or a wiki page. They’ll create a visual representation (e.g. chart, table, videotaped performance) that shows cause/effect relationships within the ecosystem. By communicating with experts in the field (by email, wiki, etc.), they’ll discover current solutions and actions being taken to combat this problem. They will also propose their own solutions and actions.

Students will be assessed using two rubrics. The content rubric evaluates presentation criteria and is designed and scored by the teacher. The group work rubric will be developed by the class to score individual cooperative group skills. Students will self-assess along the way and teacher will give final score.

Groups design a digital presentation for our Lake Day event, a school celebration of student learning about the Lake Champlain Basin. The whole school and parents attend this event. Also, students will invite the community experts that they worked closely with on their project and extend invitations to the general public on our school’s website and a notice on the Bristol Front Porch Forum. As part of Lake Day the 5th and 6th graders will present, in small groups, the results of their ecosystems research. This will include an explanation of their topic (using content vocabulary effectively), a representation of the cause and effect, description of possible solutions, and specific ways the community can take action. The presentation should educate the community about the problem and convince them to take action.

Ultimately, these presentations will be uploaded to the school website. Selected presentations will also be shared at a school assembly.

**Differentiated Instruction:**

Differentiating Content

* gather material in a variety of reading levels: including print and online
* provide different formats of research materials: “books on tape” for students, find video and news clips
* Use reading “buddies” to work on text
* meet with small groups (routinely meet with groups that need extra support):
* provide small group mini-lessons of content or process (depending on what they need)
* provide options and extensions for groups who successfully finish project early: explore a different ecosystem that has a similar issue to the one you studied-compare and contrast
* provide organizers for note-taking: cause and effect representation, project organization
* provide key vocabulary lists
* provide choice in topic based on interest

Differentiating Process

* provide packet with checklists, organizers, and guidelines to focus students (variety of levels of scaffolding in graphic organizers)
* provide resource materials in a variety of levels
* meet with small groups to teach mini-lessons on varied skills: asking good research
* questions, conducting interviews, using the internet to find information
* Interest-based work groups
* provide choice in how to present findings
* provide choice in working in small group or independently

Differentiating Products

* allow students to choose how they represent their understanding of the cause and effect
* allow students to choose the digital tool to present their final project.
* provide opportunities for students to independently explore a topic in further depth than what the project requires

**Student-centered Learning:**

* **Relevant:** This unit is relevant because the Lake Champlain Basin is our home. Students use the lake all the time: fishing, swimming, boating, vacation homes.
* **Choice:** Students are part of the decision making process because they are choosing what current problem to study based on their own personal interests.
* **Collaboration:** Students are collaborating with peers and outside experts.
* **Authentic Work:** Students are learning about a current, real-world problem and learning ways to instigate change in their community.
* **Authentic Audience:** Students will share their work with their peers, families, community members who take part in the Google Form surveys, and the experts that they worked closely with during their project. Students will invite field experts to view their presentation either on-line or in person. Final projects will be posted on the school website for community members to see.
* **Challenge/Rigor:**  Students are applying their understanding of ecosystems to a new context (LCB). Students will be engaged in questioning and discovering new ideas. Students will be faced with a complex problem that has multiple perspectives and no easy answers.
* **Shared Responsibility:** Students work together with teacher to set group work expectations and create a scoring rubric for project completion.

**Inquiry-based Learning:**

This summative project is primarily a **guided inquiry** project because teacher presents the problem for research. However, there is opportunity for more **open inquiry** because students can propose their own problem within the content area to explore. For some groups more **structured inquiry** may be necessary to get them started on their research.

**Materials:**

Note-Taking and Organizational Skills Packet

Proposal Plan

**Resources:**

[ECHO Lake Aquarium and Science Center](http://www.echovermont.org/index.html)

* Cynthia Norman, cnorman@lcbp.org

[Lake Champlain Basin Program](http://www.lcbp.org/)

* LCBP-Colleen Hickey, [chickey@lcbp.org](mailto:chickey@lcbp.org)

UVM Watershed Alliance

* UVM Watershed Alliance, Erin De Vries, [erin.haney@uvm.edu](mailto:erin.haney@uvm.edu)

<http://www.nhptv.org/natureworks/nwepecosystems.htm>

<http://www.uvm.edu/~watershd/>

<http://www.lakechamplaincommittee.org/about-lcc/history/>

Kids Discover: Ecology, February 2002. Kids Discover

Kids Discover: Lakes, April 2003, Kids Discover

Amy B. Demarest, This Lake Alive: An Interdisciplinary Handbook for Teaching and Learning about the Lake Champlain Basin, Shelburne Farms, 1997.

<http://www.vpr.net/news_detail/69394/>

<http://www.vpr.net/cse/index.php?cx=004494789804094847079%3As-qmsnitz7s&cof=FORID%3A11&ie=UTF-8&q=Lake+Champlain&siteurl=www.vpr.net%2Fnews_detail%2F69394%2F>

**21st Century Skills including Technology:**

* *Communication/Collaboration:* Students will be collaborating and communicating with peers and experts using email, wiki pages, in-class work, field trips, Skype interviews
* *Critical Thinking/Problem Solving:* Students will be faced with researching a real-world problem involving complex issues and multiple perspectives. They will be examining current solutions and proposing their own. Students will face group dynamics issues to work through as they collaborate on a final project.
* *Creativity/Innovation:* Students are given choice in how to represent information and creativity will be encouraged. Students will have access to digital cameras, Flip Video cameras, Netbooks, and skills using a variety of presentation software (VoiceThread, Prezi, PowerPoint, Audacity, Movie Maker, etc.). When faced with coming up with new solutions to problem, students will be encouraged to go beyond what has already been tried.
* *Information/Media Fluency:* Students will use books and online resources to gather information and explore the problem that they chose. They will need to analyze the reliability of information that they find and decide what is important to their research question.

**Lake Champlain Ecology Project Presentation Rubric**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Criteria** | **4-Above and Beyond** | **3-You’ve got it!** | **2-Almost there** | **1-Just getting started** |
| **Addressing Research Questions** | Presentation addresses all class- generated guiding questions accurately and adds student generated questions. | Presentation addresses all class-generated guiding questions accurately | Presentation addresses most of the class-generated guiding questions accurately and/or addresses all the guiding questions with some misconceptions. | Presentation lacks accuracy or depth of understanding. |
| **Digital Tools** | Presentation shows evidence of extensive research with a great variety of resources (primary and secondary) both on and offline and lists all resources used | Presentation includes evidence of usage of a variety of reliable sources both online and off line  and  lists all resources used | Presentation includes a limited amount of and/or less reliable sources or lacks an accurate resource list | Presentation is missing evidence of using reliable sources |
| **Cause and Effect Representation** | Cause and Effect Representation shows sophisticated understanding of complex cause and effect relationships by including 5 or more. | Cause and Effect Representation reflects 4 cause and effect relationships | Cause and Effect Representation reflects 2-3 cause and effect relationships | Cause and Effect Representation reflects 1 or no cause and effect relationships |
| **Environmental Responsibility** | Presentation suggests reasonable action steps for solving or minimizing problem and students include a unique creative solution and implement it | Presentation suggests reasonable and specific action steps for solving or minimizing the problem | Presentation suggests unreasonable or vague action steps for minimizing the problem | Presentation lacks reasonable actions steps for minimizing the problem |
| **Ecosystems Vocabulary** | Presentation demonstrates understanding of ecosystem vocabulary by including at least 15 words from the word list and adds other complex science vocabulary. | Presentation demonstrates understanding of ecosystem vocabulary by including at least 15 words from the word list. | Presentation demonstrates understanding of ecosystem vocabulary by including 10-14 words from the word list. | Presentation demonstrates a lack of understanding of ecosystem vocabulary by including less than 10 words from the word list. |

**Science Lessons**

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**Created by Rebecca Zavadil**

**“We’re All In This Together” Science Lessons**

**Table of Contents**

Pre-Lesson Bottle Ecology

Attachment-Directions for Bottle Ecology

Lesson 1 The Lake Champlain Basin and Us

Attachment-Parent Interview Sheet

Lesson 2 We’re All in this Together-Unit Introduction

Lesson 3 Working Together in an Ecosystem

Attachment – Your Own Ecosystem

Lesson 4 Energy Flow

Attachment-food chain exit card (pdf)

Attachment-photosynthesis review (pdf)

Lesson 5 Variety is the Spice of Life-Biodiversity

Lesson 6 Going Deeper into Lake Champlain

Attachment – Layers of life

Lesson 7 The Balancing Act

Attachment-Cause and Effect Assessment (pdf)

Attachment-Cause and Effect Organizer (pdf)

Attachment-Alternative Cause and Effect Organizer (pdf)

Lessons 8-10 Inquiry with Ecosystem

Attachment – Experiment Sheet

Attachment-Scientific Method

Attachment-Experiment Summary Homework

Lesson 11 Lake Champlain-Our Precious Ecosystem

Attachment – Google Earth Placemark Guided Frame

Lesson 12 Let’s Take Action!

Attachment – Lake Champlain Ecology Presentation

**Creating 21st Century Classrooms:**

**Connecting the Dots IV**

**Lesson Title:** Science-Bottle Ecology

**Name of Corresponding Unit:** We’re All in this Together

**Creator:** Rebecca Zavadil

**Grade level(s):** 5 and 6

**Recommended Duration:** 50 minutes, IN SEPTEMBER!

**Essential Question:** How can we build a small ecosystem?

**Specific Learning Goals for this lesson:**

* Students will **know**: how to create their own ecosystem in a bottle
* Students will **understand**: An ecosystem is a community of living and nonliving things that work together in a balanced way.
* Students will **be able to:** Create their own ecosystem in a bottle and explain what the elements are that make it a balanced ecosystem.

**Lesson Overview:**

Students will create their own terrarium (or ecosystem) in a bottle. This ecosystem will be used to conduct experiments about equilibrium in future lessons.

**Description & Sequence:**

* Explain to students that they are going to create their own “ecosystem” in a bottle. They will observe this ecosystem over time and watch its changes and then in a month or so they will be conducting experiments with it.
* Students will receive a list of all the things that are required for their bottle. Students will work outside on the playground to avoid a mess in the classroom. Students will have resources and materials to add to their bottle. Students can choose to put essential elements in where they choose and then design it further with flair if they want to.

Materials needed for “ecobottle”

2-liter plastic soda bottle

soil

pebbles

water

bean seeds

scissors

pencils

packing tape

ants or other insects (from playground)

* I will explain to students that we will be conducting science experiments with these later, but our first job will be to observe the ecosystems and learn from what happens. I will lead them through designing an observation sheet where they can record what they see by writing and drawing diagrams. Students will keep their bottles in the classroom and they will fill in the observation chart in their science notebooks each time they come in to class to keep track of the changes. Once a week they will use the digital camera to take and print out a picture that they will paste in their observation sheets. After a month or so and prior to using them for experiments, students will gather in groups of 3 or 4 and compare their results-did the ecosystems change at the same/different rate? Do they look the same/different? If so why?

**How will you Differentiate Instruction for various learners?**

Directions will be kid-friendly and at a readable text level for all and there will be room for creativity and innovation.

**Student-centered learning**

With the exception of the essential list, students get to design their own special ecosystem.

**Inquiry-based learning:**

This will come in the future lessons when they conduct experiments based on inquiry.

**Materials:**

2-liter bottles

Soil, plant seeds, water, seeds, pebbles

pencils

scissors

Directions for making the ecosystem

**Resources:**

[Closed Ecosystems](http://settlement.arc.nasa.gov/teacher/lessons/bryan/ecosys/)

[Ecosystem in a Bottle](http://www.relia.net/~thedane/ecosystem.html)

**Vermont Standards & Grade Expectations Addressed:**

S 5-6: 34-37

**21st Century Skills including Technology:**

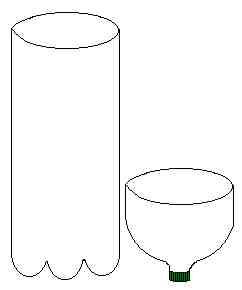
Critical Thinking/Problem Solving- design process

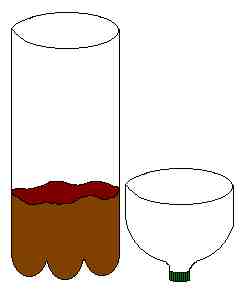
**Files Attached:**

Directions for making the ecosystem

Build Your Own Ecosystem in a Bottle

In order to learn more about ecosystems and how everything is connected in our natural world, we will be building our own ecosystems. We will be observing these ecosystems over time. It is important to take care of your ecosystems and follow the directions carefully so that we can use them later for experiments. Have fun!

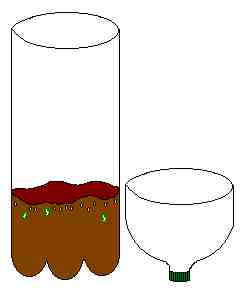
Everyone will need one large **CLEAR** 2-quart or 3-quart soda bottle with the label removed.  Take a strip of masking tape and run it along the top part of the bottle, right where the neck just starts to taper. *Carefully*, using a pair of scissors, cut horizontally around the bottle using the edge of the tape as your cutting line, then remove the tape.  Keep the top portion along with its cap for later use.

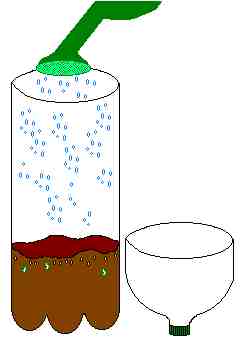


Place about 1/2" of pebbles or gravel in the bottom of the bottle to aid drainage.  Now loosely add 3" of potting soil (or good garden soil).  Tap the bottle so the soil will settle some, but not enough to pack it tight.

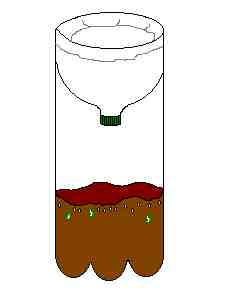


Get a pack of bean seeds and some grass seed.  You'll need 3-4 bean seeds and 2-3 pinches of grass seed per bottle.  You can also add moss, snails, potato bugs, worms, and other insects if you like.  (*Careful*, some insects or caterpillars will eat your plants).

Using a pencil, poke holes about 1" deep in the soil.  Place a bean seed in each hole.  If you plant them near the bottles edge, you'll be able to see the roots sprout and grow.  Lightly recover the beans.  Now lightly sprinkle the grass seeds over the top of the soil.  Scratch the surface lightly with a fork to place the grass seed just slightly under the soil (not too much).



Sprinkle (not pour) water into the bottle until the soil is very damp but not soaked.  Let it sit for a while and watch the water permeate through the soil.  Sprinkle more water again until the soil is damp *all the way down to the bottom*. If the bottle is turned slightly on its side you should **not** be able to see water flow up the side, otherwise you have too much water.

Screw the cap on tight and place the top back on the bottle.  You may invert the bottle (as I did) or you can replace it as it was.  Using clear 2" wide scotch tape, tape the top back onto the bottle, making sure that it is ***well sealed***. Identify each bottle with a label (name & date started).  The bottles should now be placed in a *warm sunny* spot that at least receives indirect light for most of the day.  Make sure it doesn't get too hot and bake the young starting plants.

Directions and pictures from http://www.relia.net/~thedane/ecosystem.html

**Creating 21st Century Classrooms:**

**Connecting the Dots IV**

**Lesson Title:** The Lake Champlain Basin and Us

**Name of Corresponding Unit**: We’re All in this Together

**Creator:** Rebecca Zavadil

**Grade level(s):** 5 and 6

**Recommended Duration**: 50 minutes, 2 sessions

**Essential Question:**

What are the connections among living and non-living things within and across systems?

Why should we take care of the world around us?

**Specific Learning Goals for this lesson:**

* Students will **know**: We live in the Lake Champlain Basin. Students can work to protect their environment by learning about the lake and the problems it faces, and by taking action. The boundaries of the Lake Champlain Basin. There are many living and nonliving things within the basin.
* Students will **understand**: Humans have a responsibility to take care of the natural world around them. We live in a system of living and nonliving things.
* Students will **be able to**: show their prior knowledge about the unit concepts, outline the Lake Champlain Basin and locate their home within it, list living and nonliving things within the basin.

**Lesson Overview:**

This lesson will kick off the unit; We’re All in this Together. Prior to this lesson the 5th/6th grade teams will have taken field trips to Mt. Philo (where they will learn about the concept of the Lake Champlain Basin) and Conservation Days (where they learn about ways to take care of the natural world). This lesson will connect these two field trips and the summative project by allowing time for exploration of the Lake Champlain Basin and discussion of its importance in our lives, and by learning that it faces problems that will affect its future. Students will learn that they are the next generation of protectors of the basin and that they will be developing a project to educate community members about these problems and suggest ways they can help. This will be the “hook” for students to get excited about taking care of where they live.

**Description & Sequence:**

\* This is the first lesson in We’re All in this Together. **Prior to this unit**, students will have had lessons in the following:

*Science and Technology*

What do scientists do? Inquiry and scientific method practice

Group Work Expectations

Start bottle ecosystems, for use later (see pre-lesson)

Digital Citizenship

Presentation Tools (Powerpoint, Prezi, Glogster, Movie Maker, flip, digital cameras)

How to communicate effectively using email, wiki

They will have also taken an interest survey that will help me understand where students’ outdoor interests lie:

Ecology Interest Survey - <https://spreadsheets.google.com/a/anesu.org/spreadsheet/ccc?key=0ArjWfv57Ke8ddGVIWVJybHQzM0pGZmVkd2xDbkdHcVE&hl=en_US#gid=0> (Survey includes questions about their favorite outdoor spot and activities).

**Unit Pre-assessment:** All students will get on their Netbooks and log on to their email (5th grade students will be paired with a 6th grade student for a tech buddy). They will find a Google Survey Form from me that they will open up and answer the pre-assessment questions. <https://spreadsheets.google.com/a/anesu.org/spreadsheet/viewform?hl=en_US&formkey=dGVIWVJybHQzM0pGZmVkd2xDbkdHcVE6MQ#gid=0>

The following questions will be addressed in the Google Form:

*How are living and nonliving things connected in the natural world?*

*How can you take responsibility for the natural world around you?*

*Questions about photosynthesis, food chains/webs (multiple choice)*

*Give an example of an ecosystem.*

*What makes it an ecosystem?*

*How do living and nonliving things depend on each other in this ecosystem?*

*Give an example of something that could affect this ecosystem? Explain.*

As students finish the pre-assessment...

* When students have finished the survey I will ask all students to come back for a discussion (those who need it will have time to finish the survey later). Using the projector and laptop I will show a short slideshow of the basin (some personal photos from our prior field trips and some from other online resources).“We live in a special place. We live in the Lake Champlain Basin or watershed (refer to Mt. Philo trip). It has many important natural resources that we probably never think about. Can you name any? What are some of the reasons why the basin is so important to you? The ecology (the study of living things and their environment) of the basin is a hot topic these days. The basin is a a precious environment that faces many dangers to its future. Does anyone have an example of an issue that it faces?”
* “You can make a difference! (refer to This Lake Alive, p. 445) You are the next generation of protectors for the basin and it’s up to all of us to take care of it. What are some of the ways that you take care of your environment everyday? (refer to Conservation Days) In order to take care of this place you will need to understand it by learning key science and social studies concepts and learn new ways to take action to protect the place you live in.”
* This is where I will introduce the ideas of the summative assessment and that for the next few months we will be learning key science concepts to learn about our local environment (Lake Champlain Basin) and to effectively teach the community about how to take care of our precious “backyard.”
* First we need to explore it! Let’s explore this place by using Google Earth. At this point students will have time to finish the survey and others will start the Google Earth exploration.
* Students can get together with a partner of their choice and they will log on to Google Earth and find the Lake Champlain Basin. They can use the posters in the room to help them figure out the boundaries of the basin. (Tech buddies will be available to help out)
* Once students have located the basin I will show them how to draw a shape around it to create its boundaries. At this point briefly talk about what a basin/watershed is (This Lake Alive, p. 413) Where do you live in the basin?
* Together with their partners they will begin a brainstormed list in their journals as to what the basin is made up of (i.e. people, stores, mountains, lakes, rivers, animals, etc.). After a minute or so, guide them to identifying only things from the natural world (veer away from their favorite stores and restaurants). Their list can be from prior knowledge combined with what they observe in photo layers and the satellite view in Google Earth. During this time I will circulate through the groups and challenge them to go deeper and be specific (ie. if they write animals, I could ask them to list some of the different types of animals they see or have seen).
* Then we will all come back together as a class and discuss the lists that students came up with.
* Then I’ll pose the question, “What makes the basin so important? special?”
* For homework, students will interview their parents about what they think makes the Lake Champlain Basin so special and what they do to take care of it. (Students can write a bulleted list or write a paragraph for their response; they could also provide pictures and captions)
* After class take some of the examples from the lists students created and list them on chart paper for the next lesson.

**Summative Assessment:** This will serve as the “hook” for the summative project.

**How will you Differentiate Instruction for various learners?**

* **Content:** Students can use the different layers in Google Earth to produce a thorough list of living and non living things that make up the basin.
* **Process:** Students who need more time for pre-assessment can have it. Tech buddy provided for Google Forms and Google Earth help. Choice in partnerships.
* **Product:** Students have a choice in how to write up interview (photos/captions, lists, or paragraph)

**Student-centered learning:**

* **Shared Responsibility**: Students are exploring/discovering and brainstorming in partnerships. Their list will guide further class discussions.
* **Choice:** Students have a choice in partners, layers to use in Google Earth
* **Relevant:** Students will be exploring their local environment and locating their home within it.

**Inquiry-based learning:**

**Guided inquiry**: Students are given a general guide for what to look for within the basin but students have unlimited ways to explore and find information and ideas.

**Materials:**

Netbooks

**Resources:**

[www.lcbp.org](http://www.lcbp.org)

This Lake Alive, p. 413-424

Google Earth

Google Forms

**Vermont Standards & Grade Expectations Addressed:**

This lesson will lead into the following GEs:

**S5-6:36 Students demonstrate their understanding of Equilibrium in an Ecosystem by...**

Experimenting with a closed system and drawing conclusions about how an environmental change affects the system (e.g., bottle biology).

Science Concept:  
a. The number of organisms an ecosystem can support depends on the kinds of organisms present and the availability of biotic and abiotic resources (i.e., quantity of light and water, range of temperatures, and soil composition).

**H & SS 5-6:14 Students act as citizens by…**

Identifying problems and proposing solutions in the local community, state, nation, or world.

**21st Century Skills including Technology**:

Using Google Earth to get a sense of place and context for unit

**File Attachments**:

Parent interview sheet

 Lake Champlain Basin Parent Interview Guide

Have a conversation with your family about the following questions. You can write a paragraph or make a list.

Why is the Lake Champlain Basin special to you and your family?

Do you know about any of the issues that the lake faces?

Do you know of any ways to take care of it?

**Creating 21st Century Classrooms:**

**Connecting the Dots IV**

**Lesson Title:** We’re All in this Together/Unit Introduction

**Name of Corresponding Unit:** We’re All in this Together

**Creator:** Rebecca Zavadil

**Grade level(s):** 5 and 6

**Recommended Duration:** 50 minutes, 2 sessions

**Essential Question:** How are all things in the natural world connected?

**Specific Learning Goals for this lesson:**

* Students will **know**: Examples of ways that nonliving and living things are connected in the natural world.
* Students will **understand**: All things in the natural world are connected.
* Students will **be able to**: act out an example of how living and nonliving things in the natural world are connected

**Lesson Overview:**

Students will be introduced to the big ideas of the unit and generate prior knowledge about the concepts. Students will be exploring the concept of interdependency in the natural world by generating and acting out examples of how living and nonliving things are connected in the Lake Champlain Basin.

**Description & Sequence:**

* We will begin the lesson by sharing out some of the thoughts from the homework (what makes the environment of Lake Champlain Basin so special?) I will culminate the sharing by reiterating how important it is that as citizens of this world, we understand and help the natural world around us (by building on student/parent shares). These written pieces will be hung up in the hall on our Lake Champlain display (This display will be added to over time. It will include pictures, memories, and thoughts by students about the Basin).
* I will then share out the title and big idea of this unit on the board:

**Unit Title:** Ecology: We’re all in this Together

**Big Ideas**: Everything in our world is interdependent.

* Then I will ask students what these statements mean. What is ecology? How are the living and nonliving things dependent on each other? In the Lake Champlain basin? How are we dependent on each other in class, school, and community? Students will take a few minutes and start a brainstorm list in their notebooks under the unit title and big ideas. I will add student ideas on a concept map using Bubbl.us. (The first month of school heavily stresses community and so I imagine that they will probably think about their role within the school community. Our prior lesson was all about the Lake Champlain Basin so students may focus on that as well.) This is a brainstorm so any connections that students make are fine.
* Explain to students that in order to understand and protect our local environment we have to understand how things are connected and the impact everything has on everything else (ecology). Post the chart paper with the list of class generated ideas of living and nonliving things within the basin from last lesson. Think about the Lake Champlain Basin and with a partner brainstorm ways that the things on this list are connected. Is there only one way, more? (i.e. How do the deer depend on the trees? How do birds depend on the waterways? How does Lake Champlain depend on the rivers? How do plants depend on the sun?)
* Then I will read A Log’s Life by Wendy Pfeffer and ask them to listen for how living and non-living things depend on each other in the story.
* When I finish reading I will ask students to share out some of their thoughts. Are there categories that we could put these ideas into? (food, habitats)

\* Note: Reading teacher *will be using A River Ran Wild, by Lynne Cherry as a “traveling book.” Each night a student will take the book home and read it with their family and then write in a* journal that travels with the book.

* In those same pairs have students pick out their favorite example and act it out for the class. Hand each student a strip of large paper. After students act out their example they will write it on the strip. In the class there will be a display board with the unit title and big idea on it. Students will each add to the display.

**Formative Assessment**: I will use students’ brainstormed list to keep anecdotal notes: do they mention concepts of photosynthesis? Food chains? Together with the pre-assessment, I will have valuable information about what students already know.

**How will you Differentiate Instruction for various learners?**

* **Content**: Use a concept map for visual connections, discussing and acting out relationships in nature
* **Process**: flexible grouping (whole group, partners, individual)

**Student-centered learning:**

* **Shared Responsibility**: responsibility will be shared to contribute to discussion and share ideas, creating classroom display together.
* **Challenge/Rigor**: making connections about connectedness in a new scenario (read aloud)

**Materials:**

Science journals

**Resources:**

[www.bubbl.us](http://www.bubbl.us)

Pfeffer, Wendy, A Log’s Life

**Vermont Standards & Grade Expectations Addressed:**

S 5-6:34-37

**21st Century Skills including Technology:**

Bubbl.us concept mapping

**Creating 21st Century Classrooms:**

**Connecting the Dots IV**

**Lesson Title**: Science-Working Together in an Ecosystem

**Name of Corresponding Unit:** We’re all in this Together

**Creator:** Rebecca Zavadil

**Grade level(s):** 5 and 6

**Recommended Duration:** 50 minutes, 2 sessions

**Essential Question:** What is an ecosystem? What is the interdependency among non-living and living things within an ecosystem?

**Specific Learning Goals for this lesson:**

* Students will **know:** An ecosystem is a community of living and non-living things that work together. The living (biotic) elements in an ecosystem are plants and animals. The essential nonliving (abiotic) elements in an ecosystem are sun, water, air, and soil.
* Students will **understand:** That all things within an ecosystem depend on each other. There are key elements that all ecosystems require to survive. There are different types of relationships within ecosystems.
* Students will **be able to:** Identify ways that living and nonliving things depend on each other in an ecosystem and give some examples. Observe an ecosystem.

**Lesson Overview:**

This lesson will introduce the science concepts of ecosystems, biomes, and the biosphere. During this lesson students will explore what an ecosystem is by focusing on the key elements and ways in which living and non-living things depend on each other and work together for survival.

**Description & Sequence:**

* Post 4 images of ecosystems/biomes (including one of the pictures from the Mt. Philo trip of the basin) up on the interactive whiteboard and ask students to list or draw some similarities and differences between the in their journal. Are there key elements in all of these pictures?
* Ask students to pair share about similarities: what makes these all similar/different? Students will make a list of all of the common elements within these 4 pictures. When pairs think they have all the common elements, they will then add them to whiteboard using the mimio pad. Once we have a whole class list, I will be guiding students to key elements like animals, plants, soil, water, sun, and air (this may mean probing for more ideas or sorting their ideas into these more basic categories). I will also introduce the concepts of biotic and abiotic to mean living and nonliving things.
* Show a short video, [What is an Ecosystem](http://www.google.com/url?q=http%3A%2F%2Fwww.neok12.com%2Fphp%2Fwatch.php%3Fv%3DzX7d0b756f7154415351047f%26t%3DEcosystems&sa=D&sntz=1&usg=AFQjCNHihX5bBguJ6J2ti_g87sgLgNTFhA)? introducing the concepts of ecosystems and biomes.
* After the video I will project a scene of a biome (deciduous forest) on the whiteboard and introduce the concepts of biome, biosphere, and ecosystem (let them know that sometimes biome and ecosystem are used interchangeably). As a class, we will read Ecology, p. 4-5 (these pages show the different biomes of the world and where they are. “What biome do we live in?” “What ecosystem or ecosystems do we live in?”
* This should generate ideas about what makes an ecosystem. Can a family be an ecosystem? Why or why not?
* Address the following content: An ecosystem is a community of living and non-living things that work together. Ecosystems have no particular size. An ecosystem can be as large as a desert or a lake or as small as a tree or a puddle. If you have a terrarium, that is an artificial ecosystem. The water, plants, animals, air, light and soil all work together.
* Is the Lake Champlain Basin an ecosystem? Are there ecosystems within the basin too? (This Lake Alive, p. 424)
* Then I’ll pose the question, “Could we go and visit an ecosystem today? Are there any places where we could observe living and non-living things working together with all of these elements on school grounds?” Take student ideas and use one (hopefully they suggest the playground!). Then we’ll head outside and explore an ecosystem in one corner of the playground (the garden would work well).
* Students will take notes in their science journals about what they observe (students can take digital photos, draw, and/or write observations). This is where I can talk about specific types of relationships in nature among living things if it hasn’t come up yet (plants and animals need sun, water, and air to survive; animals need other types of living things for habitats and food). Can we see any examples of these in this ecosystem?
* Make sure to address the following content during discussion.

The water, plants, animals, air, sun and soil all work together. If there isn't enough light or water or if the soil doesn't have the right nutrients, the plants will die. If the plants die, animals that depend on them will die. If the animals that depend on the plants die, any animals that depend on those animals will die. All the parts work together to make a balanced system!

* We’ll come back in and share out our observations as a whole class by reviewing the photos we took and discussing observations.

**Formative Assessment(s):** Homework assignment. Their assignment over the week is to choose a place around their house that fits the definition of an ecosystem, think about what makes their spot an ecosystem, draw a picture or take photos of it and write three reasons why they think it is an ecosystem.

Word Study teacher will be sharing information about readiness for concept instruction based on her pre-assessment of vocabulary understanding.

**How will you Differentiate Instruction for various learners?**

* **Content**: When we go outside to record observations I will take time with the students that are struggling so that I can support them in identifying ecosystem characteristics: many species, soil, atmosphere, light, etc.
* **Process and Product**: Students can choose how to record observations (draw pictures, take photos, or writing) and can choose to work alone or with a partner.

**Student-centered learning:**

* **Relevant**: Students get to explore their playground (a place very important to them) as an ecosystem
* **Choice**: Students have a choice on how they record their observations and whom they work with. For homework students have a choice how they show their ecosystem (they can draw a picture or take photos)

**Inquiry-based learning:**

Students will be exploring the question, “What makes our playground an ecosystem?

Observing and recording their findings to share out to the class. (guided inquiry)

**Materials:**

Science Journals

Outdoor spot

clipboards

Interactive white board

Digital cameras (optional)

**Resources:**

<http://www.nhptv.org/natureworks/nwepecosystems.htm>

Kids Discover: Ecology

This Lake Alive

**Vermont Standards & Grade Expectations Addressed:**

S 5-6.34-37

**21st Century Skills including Technology:**

Observation and Inquiry skills

Communicating ideas through writing or drawing

**Files Attached:**

Homework: Your Very Own Ecosystem

**Your very own ecosystem.**

**Find a place around your home that fits the description of an ecosystem.**

**The name of my ecosystem is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

**Draw or take pictures what you observe in your place that makes it an ecosystem.**

Write 3 reasons why your place is an ecosystem.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Creating 21st Century Classrooms:**

**Connecting the Dots IV**

**Lesson Title:** Science- Energy Flow

**Name of Corresponding Unit**: We’re All in this Together

**Creator:** Rebecca Zavadil

**Grade level(s):** 5 and 6

**Recommended Duration:** 50 minutes

**Essential Question**: How does energy flow in an ecosystem?

**Specific Learning Goals for this lesson:**

* Students will **know:** The sun is the original source of energy for Earth. Energy is transferred to all living things in an ecosystem and this is how organisms survive. There are different ways that energy is transferred: photosynthesis (in producers), eating food (consumers), and rotting (decomposers)
* Students will **understand:** Energy connects all living things in an ecosystem.
* Students will **be able to:** Create a diagram of energy flow in an ecosystem. Identify different parts of the food chain.

**Lesson Overview:**

Students will learn about energy flow in ecosystems by creating and looking at diagrams of energy flow and photosynthesis. Students will have a chance as a whole group and then in small groups to track the energy flow among living things.

**Formative Assessment:** Homework will be collected. Do students understand what makes an ecosystem? Do they need more practice with this? This lesson may help students who are unclear; however, I will be monitoring these students closely during this lesson to see if they need supplemental support with these initial concepts.

**Description & Sequence:**

Formative Assessment: As students come into class have them complete the photosynthesis worksheet. This will give me more information about who needs photosynthesis review.

* Project the blank template with an image bank on the interactive whiteboard using the laptop. Image bank will include graphics of sun, producer (plant), consumers (herbivore, carnivore), and decomposer.
* Explain to students that not only do living things rely on each other in the ways we discussed in the past lessons but they also are connected by energy. Explain that all living things transfer energy within an ecosystem and that is why they can survive.
* Today we’ll create a diagram of how this energy is transferred; this is called a food chain.
* I will prompt students to start the diagram by asking, “What is the original source of energy for life on Earth?” That will kick us off on completing our food/energy chain.
* Using the mimio pad, students will click and drag the image into the center and connect it with an arrow. Discussions will be guided based on what students drag into the cycle or chain. Make sure the flow is from sun to plant (producer) to primary consumer (herbivore) to secondary consumer (carnivore), to decomposer and back to plant.
* As students add an image we’ll discuss the names of the role these types of organisms play in the cycle and how the energy is transferred (photosynthesis, producers, consumers, decomposers, herbivores, carnivores) and we’ll record those words next to the image.
* Share some of the food chains from this game (The Food Chain Game ) linked below on the overhead and let students know that this will be linked to the science blog so they can try it on their own (at home or during academic choice times).
* When we have looked at a few food chains discuss concept of equilibrium and what it means for the food chain:

**Equilibrium:** As the number of carnivores in a community increases, they eat more and more of the herbivores, decreasing the herbivore population. It then becomes harder and harder for the carnivores to find herbivores to eat, and the population of carnivores decreases. In this way, the carnivores and herbivores stay in a relatively stable equilibrium, each limiting the other's population. A similar equilibrium exists between plants and plant-eaters. As you move up the chain, there is less energy transferred so it keeps the top smaller and the bottom larger in population.

Can you think of examples of this in nature?

* At this point I will use the pre-assessment and formative assessments from prior lessons to identify students that know about photosynthesis and those that don’t. I will work with the group that is unfamiliar with this concept (this may be everyone; if so, then each station will turn into one whole lesson):

***Photosynthesis Station:***

* These students need to understand that plants use the sun, water, and carbon dioxide to create food (energy) for themselves and give off oxygen that we use to breathe. The sun’s energy is transferred through the process of photosynthesis and this is why when animals eat plants they acquire energy.
* Students will watch a short video Learn About Plants - Photosynthesis describing photosynthesis and take notes using a guiding worksheet (same as entrance card). Then students will create a poster of the photosynthesis cycle to post in the classroom (using construction paper and art supplies). This will serve as reference for the entire class. They will have access to re-watching the video, looking at images, and reading text ( The Magic School Bus Gets Planted, by Lenore Notkin) to complete their poster.
* When students finish this task they will explore the food chain games [The Food Chain Game](http://www.sheppardsoftware.com/content/animals/kidscorner/games/foodchaingame.htm) on the website linked below so they will be familiar with the food chain (the website has great visuals of what actually happens within the food chain).

***Food Chains Station:***

* For the groups that already understand the concept of photosynthesis:
* I will hand out packets of images/arrows/labels for an ecosystem for each table. In small groups students will create a food/energy chain with what they have.
* If students finish early I will check in with them and make sure all students can explain the chain. If they can, then groups can extend this activity by creating a drawing of their ecosystem (using all the cards they have) and then adding in all non-living elements that are also needed to sustain life in that ecosystem.
* Card sets will include images of the following:

|  |  |  |  |
| --- | --- | --- | --- |
| **Grassland** | **Pond** | **Forest** | **Tundra** |
| sun | sun | sun | sun |
| grass | algae | fruit tree | algae |
| grasshopper | mosquito larva | deer | krill |
| snake | fish | cougar | cod |
| hawk | raccoon | bear | seal |
| mushroom | bacteria | fungi | polar bear |

* Those who clearly understand the concept will be assigned a spot on the film crew. They will circulate through groups and capture footage of them working and discussing concepts. The film crew will ask questions about their food chains. Segments of these videos will be posted on the science blog.
* I will then ask students to identify scenarios that might disrupt the food chain. If not suggested, I will pose a scenario for each group by handing out scenario cards: erosion wiped out the plants, invasive species came in and wiped out the primary consumer, pollution affected water quality and algae couldn’t survive, etc. What happened to the energy flow? What does that mean? Students will record their thoughts on the scenario card.
* Scenario cards will include:
  + Make up your own scenario
  + Invasive species was introduced by visiting boaters and wiped out the primary consumer
  + pollution from humans affected water and soil quality which made it hard for the producer to survive.
  + Erosion from severe flooding wiped out the plants in your ecosystem
  + Over hunting of the carnivores in your area wiped out the (hawk, raccoon, bear, and seal populations)
* When all groups have finished we will do a museum walk and look at all diagrams and the photosynthesis poster. Poster will be displayed in the classroom for reference.

**Formative Assessment:** Exit Card: Students will be asked to label a food chain using animals and vocabulary words. This lesson may need a follow-up lesson that involves review of these concepts before moving on. I will take anecdotal notes on student understanding based on their small group work and listen for vocabulary use; composers, producers, etc. I will circulate and ask questions to clarify understandings. Next lesson will also help solidify understanding and challenge those who are ready to make bigger connections.

**How will you Differentiate Instruction for various learners?**

* **Content:** Use of formative assessments to identify who already knows about photosynthesis. Small group work based on understandings. Information in a variety of formats for photosynthesis group. Teacher check-in to make sure all students in group understand the product. Students will be working with these vocabulary words in word study to support their understanding. Use this website to as support with this students that still are confused about food chains. <http://www.kidsknowit.com/interactive-educational-movies/free-online-movies.php?movie=food%20Chains>
* **Product:** Extension activity for early and successful finishers and alternative assignments for those that need support with concepts.

**Student-centered learning:**

* **Shared responsibility** in creating and discussing diagram and energy flow, option for creating own scenario. Film crew to add to science blog.
* **Collaboration** (see 21st Century Skills)

**Inquiry-based learning:**

* Students are presented with a problem (first as a whole group then a small group) and communicate ways to accurately represent energy flow. Students learn as a whole group and then apply it to a new situation in small groups.
* Option for making up own scenario
* Open ended questions for discussion

**Materials:**

Laminated ecosystem cards for Energy Flow

Scenario cards

Mimio and mimio pad for students

projector

Word study vocabulary sheet

“Learn About Plants - Photosynthesis” video <http://www.youtube.com/watch?v=1gLa5EWn9OI>

The Magic School Bus Gets Planted, by Lenore Notkin

flip camera

**Resources:**

Ecology, Kids Discover

River, Kids Discover

Oceans, Kids Discover

Lakes, Kids Discover

Wetlands, Kids Discover

<http://www.sheppardsoftware.com/content/animals/kidscorner/games/foodchaingame.htm> (The Food Chain Game)

<http://www.kidsknowit.com/interactive-educational-movies/free-online-movies.php?movie=food%20Chains>

The Magic School Bus Gets Planted, by Lenore Notkin

**Vermont Standards & Grade Expectations Addressed:**

S 5-6: 34-37

VTGE Communication & Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

b. communicate information and ideas effectively to multiple audiences using a variety of media formats

Grade 3-5 With guidance and working independently students consider audience and purpose when creating digital products and communicating online.

**21st Century Skills including Technology:**

* **Collaborating:** as a class to create a diagram of energy flow using the interactive white board and writing tablet. Working in small groups to solve problem and create a diagram of energy flow.
* **Critical Thinking**: students will be asked to apply what they learned about ecosystems so far in a new situation to create an energy flow diagram.
* **Communication:** Film crew will contribute to science blog material which will communicate to parents what we are learning about in class

**File Attachments:**

Food Chain Exit Card (pdf)

Photosynthesis review (pdf)

**Creating 21st Century Classrooms:**

**Connecting the Dots IV**

**Lesson Title:** Science-Variety is the Spice of Life

**Name of Corresponding Unit:** We’re all in this Together

**Creator:** Rebecca Zavadil

**Grade level(s):**5 and 6

**Recommended Duration:** 50 minutes, 2 sessions

**Essential Question**: How are ecosystems complex? Why is biodiversity important to an ecosystem?

**Specific Learning Goals for this lesson:**

* **Students will know:** Energy is actually transferred to all living things through a food web (vs. a food chain), which is more complex. Biodiversity refers to the variety of living organisms in an ecosystem. The more species it has, the more diverse it is. Biodiversity makes an ecosystem healthier.
* **Students will understand:** Ecosystems are complex and require biodiversity. Living things in an ecosystem are all connected.
* **Students will be able to:** Follow the transfer of energy in a food web. Create their own food web as a class.

**Lesson Overview:** Students will explore the complexity of an ecosystem by simulating the energy flow in an ecosystem. They will soon discover that when there are more species, the energy flow becomes a web verses a chain.A naturalist from the ECHO Center will speak to students about the ecology of Lake Champlain and the importance of biodiversity.

**Description & Sequence:**

* Group Challenge: As students walk in they are handed a necklace with a species card on it using a ball of yarn to represent energy transfer. Students need to show the energy flow within the ecosystem and back up their reasoning. Each person will need to explain why and how they transferred energy to the next species. (listen for conversations and take anecdotal notes about what students know)
* Species cards for the necklace include the species found in the food web in Lake Champlain, This Lake Alive, p. 425.
* Discover it is a web versus a neat chain. As a whole group read Ecology, pgs. 6-7.
* Introduce the concept of biodiversity by asking students about the types of animals/plants they have seen in their yards, at a favorite park, or in Lake Champlain. Have them draw a picture of their favorite outdoor place and include drawings of all the living things in that area. What if everything looked the same and there was only one species of living thing in your yard or favorite place? Would it change how you felt about it? Would there be a problem with that? (students will make connections between biodiversity and the health of an ecosystem and link it also to their enjoyment of a place).
* Content: Biodiversity is vital for supporting all life on Earth. It provides all of our food and many industrial products and medicines. Biodiversity also ensures clean air, water and fertile soils, it provides opportunities for recreation, tourism, scientific research and education, and it is a source of cultural identity for many people. Biodiversity is the foundation of healthy, functioning ecosystems upon which all life depends. Biodiversity helps with:
  + soil formation
  + nutrient, nitrogen, oxygen and carbon cycling
  + energy production
  + flood and erosion control
  + clean air
  + clean water
  + breaking down pollutants
  + pest and disease control
  + food and medicines.
* In small groups, students will take the same ecosystem cards they used in the last lesson but with added species and create a food web (a more “biodiverse” ecosystem).

|  |  |  |  |
| --- | --- | --- | --- |
| **Grassland** | **Pond** | **Forest** | **Tundra** |
| sun | sun | sun | sun |
| grass | algae | fruit tree | algae |
| grasshopper | mosquito larva | deer | krill |
| snake | trout | cougar | cod |
| hawk | raccoon | bear | seal |
| mushroom | bacteria | fungi | polar bear |
| mouse | heron | rodent | grass |
| fox | Pond snail | bird | wolf |
| rabbit | bass | skunk | insects |
| Owl | pike | insects | Snowy Owl |

* Students will use the same scenario cards from last lesson and apply them to the food webs. Does this make the ecosystem healthier, sicker, stronger, weaker, more enjoyable, less enjoyable? Why? Pair share and then whole class debate.
* As a follow up to this lesson on biodiversity, have a naturalist at the ECHO Center Resource Room come and speak with students about Lake Champlain ecology, including focus on the importance of biodiversity. Students will take notes from the presentation in their science journals and a few students will be selected to film the interview (Flip Video cameras) so that we can post it on the science blog. Students can use this film in future lessons and during the summative research if there are some key points made that need reviewing.

**How will you Differentiate Instruction for various learners?**

* **Content and process**: small group work, simulation or acting out the food web (this will help students that may not have understood it with images), use website to show food chains and webs and what happens.

**Student-centered learning:**

Each student has a role in the simulation

Whole group deciding on energy flow route.

**Inquiry-based learning:**

Open ended question about how biodiversity affects an ecosystem.

**Materials:**

Ecosystem Cards for energy from last lesson w/ new species added.

Ecosystem card necklaces and ball of yarn.

Flip Video cameras

**Resources:**

<http://www.sheppardsoftware.com/content/animals/kidscorner/games/foodchaingame.htm>

Kids Discover: Ecology

<http://www.ecokids.ca/pub/eco_info/topics/frogs/chain_reaction/index.cfm>

[**http://www.environment.nsw.gov.au/resources/education/BiodiversityTeachersGuide.pdf**](http://www.environment.nsw.gov.au/resources/education/BiodiversityTeachersGuide.pdf)

[ECHO Lake Aquarium and Science Center](http://www.echovermont.org/index.html) - **ECHO Center naturalist**

**This Lake Alive**

**Vermont Standards & Grade Expectations Addressed:**

S 5-6: 34-37

VTGE Communication & Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

b. communicate information and ideas effectively to multiple audiences using a variety of media formats

Grade 3-5 With guidance and working independently students consider audience and purpose when creating digital products and communicating online.

**21st Century Skills including Technology:**

* **Problem solving** (whole group activity)
* **Communication/Collaboration**: whole group and small group activity, with experts from ECHO, Flip Video film posted on blog

**Creating 21st Century Classrooms:**

**Connecting the Dots IV**

**Lesson Title:** Science-”Going Deeper” into Lake Champlain

**Name of Corresponding Unit:** We’re All in this Together

**Creator**: Rebecca Zavadil

**Grade level(s):** 5 and 6

**Recommended Duration**: 50 minutes, 2 sessions

**Essential Question:** How are lakes a unique ecosystem?

**Specific Learning Goals for this lesson:**

* Students will **know**: Lake Champlain is a lake ecosystem that has layers of life and aquatic and terrestrial organisms that depend on each other. The layers are the Aphotic Zone (bottom), the Photic Zone (middle), the Limnetic Zone (surface), and the Littoral Zone (shoreline).
* Students will **understand**: Lakes have 4 different layers of life and species that make those layers their habitats.
* Students will **be able to**: identify at least 5 species that exist on most lake ecosystems, identify the 4 layers of life in a lake

**Lesson Overview:**

Students will learn about the layers of a lake and the diverse species that make up a lake ecosystem by reading in Kids Discover: Lakes and by creating a podcast of the sounds and actions in a lake.

**Description & Sequence:**

As an ongoing project for the next few weeks, create a [Voicethread](http://voicethread.com/) with a few pictures of Lake Champlain. Introduce this Voicethread using the laptop and projector. Ask the students to reflect and respond to the Voicethread throughout the next few weeks (pose a deadline that makes sense based on time and numbers of students). Pose the question, “What makes Lake Champlain a unique and special ecosystem?” If students have special pictures that they want to upload to the Voicethread and respond to, and share with the group they can.

* Let students know that today they are going to be exploring lakes as an ecosystem so that they can better understand Lake Champlain and other lakes in the area.
* Handout Kids Discover: Lakes to all students. As a class briefly read and discuss p. 2 (“Calm Waters, Pond or Lake?” and “Most Lakes”).
* Then have students go to p. 6-7 (Layers of Life). This 2-page spread provides a great visual for students to see the different layers of a lake and the variety of common species within a lake. Explain to students that we are going to turn our classroom into this lake today using sounds and actions.
* Each pair will be assigned one of the small captions from the pages about one of the species in the lake (ex. Ducks love to munch on Duckweed and other plants). Together with their partner they will read their text and think about an action and a sound that would represent their part. (Ex. “Quack, Quack, munch, munch” while flapping your arms and mouth like a duck).
* Once all pairs have their action and sound the whole class will come back together and we will read through them. In order from the highest layer to the lowest layers, ask each pair to read aloud their text and then do their action and sound. Could we recreate the sounds of a lake by doing all our sounds together? Could we record our captions and sound affects and create a podcast using Audacity and share it on our science blog?
* Have each pair record their caption and sounds in Audacity and save the files on the school network (so that I can access them). For next class I will put all the sounds together and post it on our science blog as an .mp3 file.

**Formative Assessment(s):** Homework for the week will be a worksheet on layers of life in a lake ecosystem. I will use this to see if students understood the concepts in this lesson or if they will need more review.

**How will you Differentiate Instruction for various learners?**

* **Content**: Students will be reading in pairs a limited amount of text, I will be circulating around to partnerships to support reading, students will connect sounds and actions to the text
* **Process**: Students will be able to access their “tech buddy” if they need help with Audacity.

**Student-centered learning:**

* **Choice**: Students will have choice in whom they work with and how they make the sounds and actions for their part.
* **Shared Responsibilty**: Students will all share in the responsibility of recording their part so that the end product is complete.
* **Relevant**: Students are learning about lake ecosystems so that they can better understand Lake Champlain and how it works. Only then will they be able to learn ways to protect it.

**Materials:**

Netbooks with Audacity

microphones for each Netbook

Kids Discover: Lakes, p. 2, 6-7

**Resources:**

Kids Discover: Lakes, p. 2, 6-7

[Voicethread](http://voicethread.com/)

Audacity (audio recording/editing software)

**Vermont Standards & Grade Expectations Addressed:**

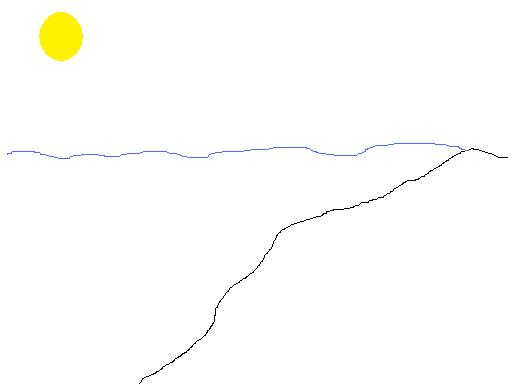
S5-6: 34-37

**21st Century Skills including Technology:**

* **Collaboration**: Students work together to create sounds and actions for species
* **Creativity and Innovation**: Students will be creative in their sounds and actions for their part
* **Audacity**: Using sound program for a whole class sound file for the science blog

**File Attachments:**

Layers of Life homework sheet

Layers of Life: Fill in the blanks with the correct zone then draw or name 5 species of plant or animal life that are typically found in lakes.

**Zone:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (shoreline)**

**Zone:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (surface)**

**Zone: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (middle)**

Word bank:

Aphotic

Photic

Littoral

Limnetic

**Zone:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(bottom)**

**Creating 21st Century Classrooms:**

**Connecting the Dots IV**

**Lesson Title:** Science-The Balancing Act

**Name of Corresponding Unit:** We’re all in this Together

**Creator:** Rebecca Zavadil

**Grade level(s):** 5 and 6

**Recommended Duration:** 50 minutes, 2 sessions

**Essential Question:** Why is equilibrium in an ecosystem important?

**Specific Learning Goals for this lesson:**

* **Students will know:** Equilibrium is the balance of all things in an ecosystem and it is necessary for a healthy ecosystem.
* **Students will understand:** Equilibrium is necessary for a healthy ecosystem. Ecosystems face many challenges that disrupt the equilibrium.
* **Students will be able to:** Identify cause and effect relationships that exist with problems that ecosystems face today.

**Lesson Overview:**

Students will move to stations in the classroom that tell real-life stories about different ecosystems and the problems they face today. Students will explore the cause-effect relationships that exist with these issues. It is important that they understand cause and effect when they are working on their summative project solving one of Lake Champlain’s problems later.

**Description & Sequence:**

* At the front of the class there will be posted guiding questions for students to explore during this lesson time: What are some real-life problems that ecosystems face today? What is the cause of this problem and what effect does it have on the ecosystem?
* Prior to the activity below, I will want to give an example of cause-effect relationships. Use the cause and effect posters and organizer from Really Good Stuff to teach these concepts. Read a short story with good examples of cause and effect. Use this to demonstrate how to fill in the organizer. I will start out by reading a part from A River Ran Wild, by Lynne Cherry (pages about pollution). I will demonstrate two examples for cause and effect and write them on the big organizer, then I will continue reading and have students try it themselves.

* **Formative Assessment:** Students will complete a short assessment on cause-effect relationships. I will collect these sheets and use them to see who needs more support with determining cause-effect relationships.
* Stations will be set up around the room that have to do with real-life problems that ecosystems face (invasive species, climate change, acid rain, pollution, etc). Students will choose to start at one of the stations based on interest level and space available (4-6 to a station). At the stations students will use the resources there: images, video, and/or text to briefly research this scenario and fill in the cause-effect relationships that exist on a fresh cause and effect graphic organizer.
  + **Station #1** (Climate Change) Students will explore a website about [Climate Change](http://www.epa.gov/climatechange/kids/index.html). This website is very kid-friendly and easy to navigate; it has text and video to support concepts.
  + **Station #2** (Invasive Species) Zebra Mussels in Lake Champlain: In this station students will be looking at a variety of materials that explore how zebra mussels have become a problem in Lake Champlain. Materials include: Lake Champlain Basin Program Fact Sheet Series, [Zebra and Quagga Mussels](http://www.lcbp.org/Factsht/Zebra2007.pdf), [VPR News stories](http://www.vpr.net/news_detail/86558/), Lake Champlain Sea Grant, [Zebra Mussel Fact Sheet](http://www.uvm.edu/~seagrant/communications/assets/zmlettersize.pdf) (some of these facts sheets are hard to understand so I will record my voice summarizing some of the information for students to listen to using a Netbook)
  + Station #3 (Acid Rain/Water Quality) Acid Rain: In this station students learn about the causes and effects of acid rain on ecosystems by using text from websites:
    - [Acid Rain on Lakes and Streams](http://dwb4.unl.edu/Chem/CHEM869V/CHEM869VLinks/www.epa.gov/airmarkets/acidrain/effects/surfacewater.html)
    - [Acid Rain Cause and Effect](http://library.thinkquest.org/CR0215471/acid_rain.htm)

They then will play a [game about acid rain](http://www.ecokids.ca/pub/eco_info/topics/frogs/acid_rain/play_acidlake.cfm) using their Netbooks.

* As students circulate, I will check in and gather students together that may need more support in reading and/or identifying cause and effect relationships and work with them at one station.
* At the end of the session ask students, “So why is maintaining a perfect balance (equilibrium) with an ecosystem so important?” (this could be a whole class discussion or an exit card, depending on time and the class)

**Formative Assessment(s):**

Collect cause and effect relationship sheets and determine whether students understand the concepts that they were exploring.

**How will you Differentiate Instruction for various learners?**

* **Content:** Variety of reading levels within stations, Text- Variety of reading levels and formats (news stories from VPR are audio); Information will be shared in a variety of ways, ie. video, text, and visuals). Use small and simple stories from Really Good Stuff poster with students who are struggling with cause and effect.
* **Process:** Some students move on to new stations (don’t have to all go at the same time). This is a time when I can gather a small group of students that still are struggling and work on a scenario with them, guiding them with the concepts that are tricky.

**Student-centered learning:**

* **Shared Responsibility:** Students will be on their own to explore the cause and effect relationships, using the information that helps them understand best.
* **Choice** in which ecosystem to start with based on interests (may make this activity more relevant)
* **Challenge/Rigor**-students will be challenged to navigate website effectively to locate the information they need to understand cause and effect

**Inquiry-based learning:**

Students are posed with the questions “What are some of the problems ecosystems face, how they came about and what are the effects of these problems on the survival of species within an ecosystem?”

**Materials:**

Cause- Effect posters, Really Good Stuff

Netbooks

Cause-effect assessment sheet

Audio recording of Zebra Mussels content

**Resources:**

Kids Discover: Wetlands

Website resources for real-scenarios

* <http://www.vpr.net/news_detail/69394/>
* <http://www.vpr.net/cse/index.php?cx=004494789804094847079%3As-qmsnitz7s&cof=FORID%3A11&ie=UTF-8&q=Lake+Champlain&siteurl=www.vpr.net%2Fnews_detail%2F69394%2F>
* <http://www.epa.gov/climatechange/kids/index.html>
* <http://www.lcbp.org/Factsht/Zebra2007.pdf>
* <http://www.uvm.edu/~seagrant/communications/assets/zmlettersize.pdf>
* <http://dwb4.unl.edu/Chem/CHEM869V/CHEM869VLinks/www.epa.gov/airmarkets/acidrain/effects/surfacewater.html>
* <http://library.thinkquest.org/CR0215471/acid_rain.htm>
* <http://www.ecokids.ca/pub/eco_info/topics/frogs/acid_rain/play_acidlake.cfm>

**Vermont Standards & Grade Expectations Addressed:**

S 5-6:34-37

VTGE: Research and Information Fluency

Students apply digita tools to gather, evaluate, and use information.

Grade 3-5 d. Students select from a predetermined list of digital tools to process gathered information and present their findings.

**21st Century Skills including Technology:**

* **Critical Thinking & Decision Making:** identifying cause and effect relationships within each station-using online sources
* **Research and Information Fluency:** students are using online resources to learn about a topic and synthesize the information they find into cause and effect relationships

**File Attachments:**

cause and effect organizer (pdf)

cause and effect assessment (pdf)

**Creating 21st Century Classrooms:**

**Connecting the Dots IV**

**Lesson Title:** Science-Inquiry with Ecosystem

**Name of Corresponding Unit:** We’re All in this Together

**Creator:** Rebecca Zavadil

**Grade level(s):** 5 and 6

**Recommended Duration**: 50 minutes, 3 sessions

**Essential Question:** What are the ways equilibrium in an ecosystem may be disrupted? What happens to an ecosystem when the equilibrium is disrupted?

**Specific Learning Goals for this lesson:**

* **Students will know:** Changing one element of an ecosystem can have an effect on it.
* **Students will understand**: Ecosystems are delicate and require clean air and water, and a balance of living things.
* **Students will be able to:** design an experiment that answers the essential question, conduct experiments using the scientific method, identify specific threats to an ecosystem

**Lesson Overview:** In small groups of four, students will conduct experiments with their ecosystems (keeping one ecosystem as the constant). Students will design inquiry experiments based on the EQ and what they’ve learned about real-life ecosystem threats and compare their findings with the constant. For example, a group may want to know, “What would happen to the ecosystem if we changed the air to exhaust fumes?”

**Description & Sequence:**

* As a whole class we will make a list of ways that they know of that ecosystems can be affected negatively (climate change, acid rain, pollution, etc.)
* Students will then break into groups. Students need to be in groups of 4; whom they’re grouped with can be a choice for students (unless it’s an obvious problem). From the whole class list, groups will create 3 inquiry questions that they will use to guide their experiments for the next three class periods. My hope is that students will use what they’ve learned so far to help guide their questions (climate change, acid rain, invasive species): “What happens when I change the water to something else, like vinegar or lemon juice? What happens if I change the air quality? What happens if I add something new?” These types of questions will show me whether they understand the prior lesson and are connecting it to a real-life problem.
* I will explain to them about the importance of having a constant so that they have something to compare it to and that the questions must be centered around the constants in the ecosystem (because everyone has those).
* I will meet with each group and check to make sure their questions are related and diverse enough and then they can get started on their experiments. Experiment sheets will be given to them so that they practice and include all of the elements of the scientific method and get used to designing their experiments that way.
* At the end of these three periods, students can share out what they found with each other. We can display the ecosystems (with labels on the bottle about the experiment done) for all classrooms to see all bottles.
* Individually, students will be asked to write a summary of their findings-homework.

**Formative Assessment(s):** Daily check-in on experiment recordings. Homework will be used to assess vocabulary use and understanding. I will share these with Word Study teacher.

**How will you Differentiate Instruction for various learners?**

* **Content:** I will help guide some groups if they need support in designing experiments or groups can share their ideas with other groups to spur their thinking.
* **Process:** Using the formative assessments each day I can support students and address specific topics that may be misunderstood.
* **Product:** Students work in small groups so that if someone struggles with writing, they could be the observer and someone else can be the recorder. During afternoon academic choice time, I could group students that need help with the summary piece and guide them through writing summaries.

**Student-centered learning:**

* **Choice**: students create and design their own experiments
* **Shared Responsibility**: Students create and design experiments and I support with experiment sheets and materials.
* **Inquiry-based learning**: students create and design their own experiments

**Materials:**

Potential materials that students might use for their experiments: salt, vinegar, lemon juice, food coloring, etc.

**Resources:**

[Closed Ecosystems](http://settlement.arc.nasa.gov/teacher/lessons/bryan/ecosys/)

[www.relia.net/~thedane/ecosystem.html](http://www.relia.net/~thedane/ecosystem.html)

**Vermont Standards & Grade Expectations Addressed:**

S 5-6: 34-37

S5-6:1 Students demonstrate their understanding of SCIENTIFIC QUESTIONING by…

• identifying multiple variables that affect a system and using the variables to generate experimental

questions that include cause and effect relationships.

S5-6:2 Students demonstrate their understanding of PREDICTING AND HYPOTHESIZING by…

• using logical inferences derived from evidence to predict what may happen or be observed in the future.

S5-6:3 Students demonstrate their understanding of EXPERIMENTAL DESIGN by…

• writing a procedure that lists significant steps sequentially and describes which variable will be

manipulated or changed and which variables will remain the same (“Fair Test”).

S5-6:4 Students demonstrate their ability to CONDUCT EXPERIMENTS by…

• collecting data and recording accurate and complete data from multiple trials.

• drawing scientifically: representing observations accurately with detail.

S5-6:7 Students demonstrate their ability EXPLAIN DATA by…

• explaining data using correct scientific terminology.

• using experimental results to support or refute original hypothesis.

• preparing a conclusion statement/summary.

**21st Century Skills including Technology:**

Critical Thinking/Problem Solving

**File Attachments:**

Experiment Sheet

Scientific Method

Experiment Summary Homework

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**Ecosystem Experiment**

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Experiment # \_\_\_\_\_

Based on what you’ve learned about ecosystems and the problems they face (pollution, acid rain, climate change, etc.) Design an experiment that tests the affects of one of these problems to your ecosystem in a bottle.

Question (design your own question for testing)

Materials

Hypothesis

Procedure

Observation

Conclusion

* Include a brief summary of the point of the experiment.
* Discuss your findings: what can you conclude about the interconnectedness within your ecosystem?
* Restate your hypothesis and then tell whether it was correct or incorrect and why.
* Give a “wrap up sentence
* In this writing piece please use ecosystems vocabulary to best communicate your thinking.

**The Scientific Method**



**Hypothesis:** Make a specific prediction about that you think will happen in the experiment based on your knowledge.

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**Materials:** List all the materials you will use in the

experiment.



**Procedure:** Explain in words, step by step the procedure you followed when conducting the experiment so others could repeat the experiment.

**C:\Users\Rebecca\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\A560CXCO\MC900352220[1].wmfObservations:** Record some things you noticed during the experiment. Share your thinking. \*Be thinking about your original question.

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**Conclusion:** Organize your data. Analyze your data and summarize your findings. Explain how the results of the experiment related to your question and hypothesis.

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**Ecosystem Experiment Summary**

**Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Write a summary of your three experiments. Your summary should include a brief description of each of your experiments and an overall conclusion of your findings. Please use ecosystems vocabulary to best communicate your thinking.

**Creating 21st Century Classrooms:**

**Connecting the Dots IV**

**Lesson Title:** Science-Lake Champlain: Our Precious Ecosystem

**Name of Corresponding Unit**: We’re All in this Together

**Creator:** Rebecca Zavadil

**Grade level(s):** 5 and 6

**Recommended Duration:** 50 minutes, 2 sessions

**Essential Question:** How are waterways connected in the Lake Champlain Basin?

**Specific Learning Goals for this lesson:**

* Students will **know**: Lake Champlain Basin is a watershed and it is the large ecosystem where we live. All waterways in the basin drain into Lake Champlain
* Students will **understand**: Lake Champlain Basin is where we live and it is a precious ecosystem with valuable resources. What we do in our local streams has an affect on Lake Champlain.
* Students will **be able to**: Locate a local stream or river and follow it to Lake Champlain.

**Lesson Overview:**

This lesson serves as a review and re-energizer for the summative project. Students will explore a map and images of the Lake Champlain Basin (LCB) and discuss what makes Lake Champlain a complex and important ecosystem in our area. Students will reflect on the Lake Champlain Basin and the reasons why they enjoy it and contribute these ideas to a layer on Google Earth. As students begin to put all of their thoughts together they will be in a perfect position to make a decision about what problem they will want to learn more about for their summative project.

**Description & Sequence:**

* With a bowl and some water demonstrate the concept of a watershed by pouring water from various sides of the bowl; all water within the watershed flows to the bottom; the bottom of our basin is Lake Champlain. When we think about protecting Lake Champlain we have to think about what we do in our local streams and rivers too.
* Have students think about an outdoor water place where they have a memory (could be the lake or a small river or pond that they go to regularly). Using Google Earth, they will create a placemark ([Creating a Google Earth placemark](http://earth.google.com/support/bin/static.py?page=guide.cs&guide=22364&topic=22367&answer=148142)) on their spot. Once they’ve made their placemark then have them trace a path from their place to the lake and show how it ultimately flows into the lake.
* If possible, have a guest from the New Haven River Watch come and talk to students about taking care of their local rivers.
* For homework have students work with their families to write paragraphs about the place: a memory or the things they like to do there, wildlife or plant life they see there, the path it takes to the lake. Ask students to directly reflect on “How are living and nonliving things connected in the Basin? Why is it important to take care of the Basin?” For struggling writers I will have frames and guiding questions available. Parents can also help by scribing for their child.
* Students will type up their writing pieces and save them to the school network. Students will be paired with a peer editor.
* Once students finish their placemark I will do small group instruction on how to share their placemark with me via email. After the first group has learned, they can provide guidance for individuals as they finish - tech buddies.
* I will then put all the layers together to create a whole team layer of placemarks with all of our memories and enjoyments in the watershed and share it on the class website for all to see. This will be important to look at right before we start the summative project.

**Formative Assessment(s):** Look at writing piece Are they using what they know about ecosystems and connecting it to their place? (Ex. The New Haven River is my favorite place to fish. There are many species of fish there such bass and trout. It is a river ecosystem because it has many living things like trees, birds, fish…It ultimately flows into Lake Champlain in…)

**How will you Differentiate Instruction for various learners?**

* New student to Vermont? Hand out images of Lake Champlain or guide them to the [www.lcbp.org](http://www.lcbp.org) and<http://www.vermont.org/visiting/attractions.aspx> and ask them to reflect on how they might enjoy it. Connect it to their known lake or body of water.
* Small groups of students will be “experts” and help other students with Google Earth
* Provide guiding questions and structured frame for students that are struggling with paragraph and what to write. Students can also use audacity and record their thoughts before they write it.

**Student-centered learning:**

* **Relevance/choice**: students are able to choose their favorite place and describe it.
* **Shared responsibility**: students and teacher and parents share responsibility for creating and contributing to whole team layer on Google Earth.
* **Challenge/Rigor**: students will be applying their understanding of ecosystems to a spot that is important to them while using technology tools effectively.

**Materials:**

Netbooks

Lake Champlain Basin poster

**Resources:**

This Lake Alive, pg. 415

Google Earth

**Vermont Standards & Grade Expectations Addressed:**

S 5-6: 34-37

W6: 17 In reflective writing, students make connections between personal experiences and ideas by…

• Using concrete details and sensory language to establish context (purpose)

• Establishing or evolving focus

• Showing evidence of individual voice and exhibiting a variety of techniques for reflecting on thoughts or feelings: questioning, comparing, or connecting

• Having coherent organization

VTGE Creativity and Innovation

Students demonstrate creative thinking, construct, knowledge, and develop innovative products and processes using technology.

b. create original works as a means of personal or group expression

Grade 3-5 Students utilize a variety of digital tools to create original works for use in an individual or group product.

**21st Century Skills including Technology:**

**Collaborating** with all 5th and 6th grade on map of the Lake Champlain Basin using Google Earth by using placemarks and contributing to larger product, with expert from New Haven River Watch

**Communication**: sharing placemark, they will communicate their reason for picking their spot and communicating their ideas using.

**Creativity/Innovation**: Students will create their own placemark to add to whole team layer, using their placemark they are

**File Attachments**:

Google Earth Placemark Guided Frame

**Google Earth Placemark**

Write two or more paragraphs about a waterway that is special to you within the Lake Champlain Basin. Use the following questions to help guide your piece.

1. What and where is your place? Describe it in detail.
2. Do you have a memory or memories here? Tell a story about an experience you had there.
3. What do you enjoy doing there?
4. What types of wildlife, plant life do you see there?
5. Where does this waterway drain into Lake Champlain?
6. How are living and nonliving things connected here?
7. Why is it important to take care of this place?

Google Earth Placemark Writing Frame

One of my favorite waterways in the Lake Champlain Basin is \_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It is located in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­\_\_\_\_\_\_\_.

I enjoy this place because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

I see many types of plant and animal life such as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ drains into Lake Champlain in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It is important to take care of this place because everything here is connected. For example,\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Creating 21st Century Classrooms:**

**Connecting the Dots IV**

**Lesson Title**: Science- Let’s take Action! *\*The beginning of the summative*

**Name of Corresponding Unit:** We’re All in this Together

**Creator:** Rebecca Zavadil

**Grade level(s):** 5 and 6

**Recommended Duration:** 50 minutes

**Essential Question:** What is threatening the health of the Lake Champlain Basin Ecosystem? What can we do about it?

**Specific Learning Goals for this lesson:**

* Students will **know**: three possible choices that they would like to research further
* Students will **understand**: Lake Champlain faces many problems and it is important for us to take action.
* Students will **be able to:** identify an issue that they feel passionate about that affects Lake Champlain’s ecosystem and begin researching it (this leads into summative project)

**Lesson Overview:**

Students will look through the material available from the ECHO Center resource room, and [Lake Champlain Basin Program](http://www.google.com/url?q=http%253A%252F%252Fwww.lcbp.org&sa=D&sntz=1&usg=AFQjCNHWzGuIs4eOsJWEL9q3XfZEoeSXvQ), and come up with 3 possible issues that they would like to research further and take action on.

**Description & Sequence:**

Introduce project (see summative description) by linking the placemark activity (what they love about the Basin) and the issues that the ecosystem faces. “You have the power to save your home and the places you love.” Talk about the project and what the end goals are. Look at rubric and talk about Lake Day.

During this class students will have time to look through all materials and learn a little bit about some of the issues. Students will be expected to come up with three possible topics by the end of the period, including an explanation about why they chose the topic.

I will then take these choices and put groups together based on interests. If some students want to do something completely different than everyone else they may work on their own (especially if they are really passionate about it).

Once students have been broken up into groups I will handout the project packet that includes directions for the project, project proposal sheet, note-taking sheets, cause- effect organizers. I will meet with each group and discuss options for collaborative partners outside of the school (staff from ECHO, the Lake Champlain Basin Program, VT Dept. of Fish and Wildlife, etc.)

The next series classes (time will vary based on school schedule) will be open for students to work on their projects. This will take many forms. Students will be using their Netbooks to conduct research, email experts, and design their projects. Students will be using text materials in the room to conduct research and collaborate with their group and outside experts. Students will be designing and analyzing results of a Google Forms survey that thy will post in the local newspaper. Students will have the option of using the project packet to organize their findings or they can use a wiki or Google Docs to share information. I will be circulating and checking in with groups. If students need support with group dynamics or content I will schedule times to meet with them.

**Summative Assessment:** This is the topic that they will be studying for their summative project.

**How will you Differentiate Instruction for various learners?**

If students are stuck I may have them work together with someone who has some ideas.

I can work with small groups that need support reading through materials.

On the board I will have suggestions for how to get started (ie. Think about what you love to do. Is there an issue that directly affects you doing this in the future? Do you love animals, fish etc.? )

Provide texts and information in a variety of levels and formats

Groups will be formed based on interest

Flexibility in grouping (some may work alone or in a smaller group)

**Student-centered learning:**

* **Relevance/Choice**: students are having time to explore what is relevant to them and make a choice about what to study
* **Inquiry-based learning:** Students are exploring the topic they would like to study further and asking their own questions.

**Materials**

<http://www.vpr.net/news_detail/69394/>

<http://www.vpr.net/cse/index.php?cx=004494789804094847079%3As-qmsnitz7s&cof=FORID%3A11&ie=UTF-8&q=Lake+Champlain&siteurl=www.vpr.net%2Fnews_detail%2F69394%2F>

Resources from ECHO Resource room

[ECHO Lake Aquarium and Science Center](http://www.echovermont.org/index.html)

[Lake Champlain Basin Program](http://www.lcbp.org/)

UVM Watershed Alliance

<http://www.nhptv.org/natureworks/nwepecosystems.htm>

[http://www.uvm.edu/~watershd/](http://www.uvm.edu/%7Ewatershd/)

<http://www.lakechamplaincommittee.org/about-lcc/history/>

<http://www.vtfishandwildlife.com/>

**Resources:**

Resources from ECHO Resource room

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<http://www.lakechamplaincommittee.org/about-lcc/history/>

<http://www.vtfishandwildlife.com/>

**Vermont Standards & Grade Expectations Addressed:**

See summative plan

**21st Century Skills including Technology:**

* **Decision Making:** students make decision about what topic to study based on prior knowledge and interest

**Files:**

Lake Champlain Ecology Presentation

**Lake Champlain Ecology Project**

Lake Champlain is in danger!  It faces many complicated problems that could have a negative impact on the ecosystem, including natural and cultural resources that we depend on. It is our responsibility to protect these resources. **You** have the power to **take action** and do something about these problems.   Here’s how…  
  
1. Choose an issue that is important to you (see my list of options if you are not sure).  
  
My first 3 choices are  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
  
2. Research your topic.  
           Use a variety of resources (books, websites, videos, interviews, collaborate with experts) to gather information. Use our guiding questions list for your research to get you started.   
  
3. Create a Google Form that will survey the Bristol community about their knowledge about your issue and what they do to take care of the lake and their local environment.  Send a link to this survey to the *Addison Independent* and to me (so I can post it on the Bristol Front Porch Forum). Collect this information and use it to guide your presentation.   
  
4. Develop a representation of the cause and effect of your topic (this representation needs to be able to be added to your final digital presentation). You may use the included graphic organizers to help you.

Ex.      CAUSE: Zebra Mussels feed on zooplankton and phytoplankton; the same things

young fish and native mussels feed on.

EFFECT: Native Mussels and young fish are slowly dying out because they have less food.

5. Submit proposal for presentation. Use the proposal sheet attached and hand it in to me BEFORE you start working on the presentation.  **Proposal is due by:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  
  
6. Design a digital presentation to share your knowledge with the community at Lake Day and on the school website.  **Presentation is due by: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  
Presentation must include:

* Overall explanation of your issue, including answers to all of your research questions.
* Visual representation and explanation of the cause and effect of your issue.
* List of action steps to help prevent or minimize issue.
* Clear audience
* Effective science vocabulary (from word lists)
* Creativity! Creativity! Creativity!

**Lake Champlain Ecology Presentation Proposal**

**Directions: Think about the information you’ve gathered and how you want to present it on Lake Day the fill out the proposal below.**   
  
**What is your project about?  Summarize your information into one paragraph.**  
  
  
  
  
  
  
  
  
  
  
  
**We are planning to use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to show are presentation.**  
  
  
**We chose this presentation tool because**  
  
  
  
  
  
  
  
  
**Questions we have.**

**We’re All In This Together**

**Word Study Lessons**

**Created by Heather Estey**



**These Word Study lessons are designed to support the ecosystems concept understanding being developed during the Science lessons of this unit. Vocabulary development work will center on both understanding the meanings of individual vocabulary words in this science context, and understanding the derivation of many of the science terms. Knowing the meanings of many of the roots and affixes in these words will allow students to predict the meanings of new words.**

**Vocabulary understanding will be assessed both during the actual Word Study lessons and in the “We’re All in This Together” unit summative assessment project.**

**“We’re All In This Together” Word Study Lessons**

**Table of Contents**

Lesson 1 Ecosystems Knowledge Rating

Attachment - Knowledge Rating

Lesson 2 Ecosystems Bubble

Lesson 3 Ecosystems Vocabulary Stations

Attachment – Vocabulary Stations Directions

Lesson 4 Three Facts and a Fib

Attachment: Ecosystems Worksheet (pdf file)

Lesson 5 Vocabulary Notebook

Attachment – Ecosystems Vocabulary for Science Folders

Lesson 6 It’s All Greek (and Latin) to Me I

Attachment – Word Study Activities

Lesson 7 Voracious Vocabulary

Attachment – Vore Words

Lesson 8 An Ecosystems Tale

Attachment - An Ecosystems Tale Directions

Lesson 9 It’s All Greek (and Latin) to Me II

Attachment - Equi De Pro Con Photo Nat Assessment

Lesson 10 Choose Your Own Roots and Affixes Adventure

Lesson 11 Ecosystems Vocabulary Sort It All Out

Attachment – Ecosystems Vocabulary Sort

Attachment – Crossword and Solution (pdf file)

Attachment – Word Search

Lesson 12 Ecosystems Pictionary

Lesson 13 Morning Meeting Vocabulary Activities

**Lesson Title**: Word Study – Ecosystems Vocabulary Knowledge Rating

**Name of Corresponding Unit**: We’re All in This Together

**Creator**: Heather Estey

**Grade level(s**): 5/6

**Recommended Duration**: 30 minutes

**Essential Question**: How do scientists use language to communicate important ideas?

**Specific Learning Goals for this lesson**:

* Students will **know**: What specific ecosystems vocabulary terms they already “know” (at a basic level).
* Students will **understand**: Scientists use specific vocabulary to share ideas, learn, and communicate their message to others.
* Students will **be able to**: Demonstrate what vocabulary terms they do and don’t “know”.

**Lesson Overview**: In their Science class students are beginning their unit on Ecosystems. They’ll begin there with brainstorming activities on the characteristics of an ecosystem. In their Word Study class with me we’ll begin with some pre-assessments to determine their understanding of the vocabulary associated with this unit. They’ll do a knowledge rating activity (rate knowledge of each word in list – don’t know it, seen it/heard it before but not sure what it means, know word and can use it) first, and then take the words they say they “know” and write a definition for them. This will be a preassessment of their prior knowledge of ecosystems concepts and associated vocabulary.

**Description & Sequence**:

1. Ecosystems Vocabulary Knowledge Rating Activity (attached) – Students will be given a table to complete that lists the pre-determined vocabulary words for this science unit. They’ll self-assess their current understanding of each term by checking in the appropriate box. They’ll then highlight the words they “know well”.

|  |  |  |  |
| --- | --- | --- | --- |
| **Word** | **Know Well** | **Seen it/Heard it** | **Don’t Know** |
|  |  |  |  |

1. Vocabulary Definitions- Students will choose at least 10 words they “know well” and write the meaning (phrase, sentence, or graphic) for the word as they understand it. They may choose more than 10 meanings to show

if they choose.

|  |  |
| --- | --- |
| **Word** | **Meaning** |
|  |  |

I’ll assess these two activities for a general sense of individual and group prior knowledge of the vocabulary terms. This will guide subsequent instruction – what terms are they familiar with? Do they understand the meanings of the terms specific to ecosystems content? Can they use the words in context? The science concept instruction will be happening mainly during science class; the science and instructor and I will work closely throughout the unit to share pre- and formative assessment information about individual students and general class’ understanding.

**Pre-Assessment**: This lesson is a pre-assessment for this unit.

How will you **Differentiate Instruction** for various learners?

* **Content** – choice of words to define
* **Process** – choice in mode of representation of meanings (words or graphics)
* **Product** – choice in level of challenge (how many words to define)

**Materials**: Knowledge Rating Activity Sheet

**Resources**:

Kid’s Discover, Kid’s Discover Ecology Teacher’s Guide, February 2002.

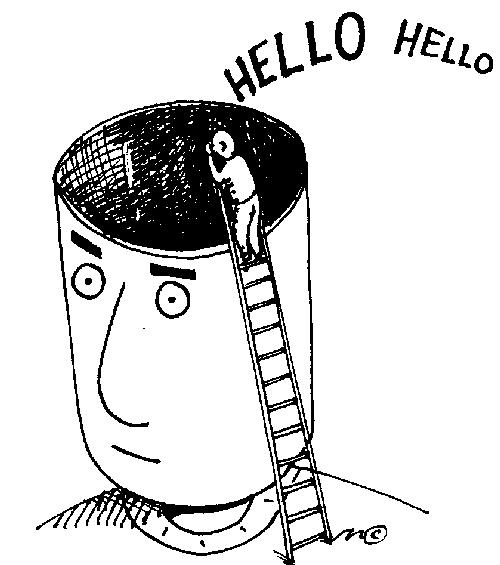
Blachowicz, Camille and Fisher, Peter J., Teaching Vocabulary in All Classrooms, Pearson Education, 2006.

**Vermont Standards & Grade Expectations Addressed:**

R6: 5 Identifies the meaning of unfamiliar words by…

• Using strategies to unlock meaning (e.g., knowledge of word structure, including prefixes/suffixes and base   
   words; or context clues; or other resources, such as dictionaries, glossaries, thesauruses; or prior knowledge)

**File Attachments**: Ecosystems Vocabulary Knowledge Rating

**Vocabulary Knowledge Rating**

*Which words do you already know? Do you know what they mean and can you use them?*

**1. Rate your own understanding of each word in the list. Check the box that fits.**

* **Don’t Know** – I’ve never seen this word before and have no idea what it means.
* **Seen it/Heard it** – I’ve seen this word before somewhere, or heard it, but I’m really not sure what it means.
* **Know it** – I know what this word means and I can use it in a sentence.

|  |  |  |  |
| --- | --- | --- | --- |
| **Word** | **Know Well** | **Seen it/Heard it** | **Don’t Know** |
| Ecology |  |  |  |
| Environment |  |  |  |
| Biodiversity |  |  |  |
| Community |  |  |  |
| Equilibrium |  |  |  |
| Ecosystem |  |  |  |
| Watershed |  |  |  |
| Habitat |  |  |  |
| Biotic |  |  |  |
| Abiotic |  |  |  |
| Biome |  |  |  |
| Biosphere |  |  |  |
| Herbivore |  |  |  |
| Carnivore |  |  |  |
| Omnivore |  |  |  |
| Decomposers |  |  |  |
| Producers |  |  |  |
| Consumers |  |  |  |
| Photosynthesis |  |  |  |
| Organism |  |  |  |
| Species |  |  |  |
| Native |  |  |  |
| Invasive |  |  |  |
| Zooplankton |  |  |  |
| Phytoplankton |  |  |  |

**2. Now circle or highlight *at least 10 words* in the list that you “Know Well”. Show the *meaning* for each. You can write a phrase, write a sentence, or draw a small graphic to show the meaning of the word.**

|  |  |
| --- | --- |
| **Word** | **Meaning** |
| 1. |  |
| 2. |  |
| 3. |  |
| 4. |  |
| 5. |  |
| 6. |  |
| 7. |  |
| 8. |  |
| 9. |  |
| 10. |  |
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| 12. |  |
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| 23. |  |
| 24. |  |
| 25. |  |

**Lesson Title**: Word Study - Ecosystems Bubble

**Name of Corresponding Unit**: We’re All in This Together

**Creator**: Heather Estey

**Grade level(s**): 5/6

**Recommended Duration**: 20 minutes

**Essential Question**: How do scientists use language to communicate important ideas?

**Specific Learning Goals for this lesson**:

* Students will **know**:
  + Some important vocabulary words scientists use to think about ecosystems
  + Concept mapping/brainstorming is a thinking tool we use to activate prior knowledge
* Students will **understand:** Scientists use specific vocabulary to share ideas, learn, and communicate their message to others.
* Students will **be able to**:
  + Collaborate with a small group to decide on important related terms, synthesize information from whole group

**Lesson Overview**: In the first vocabulary lesson in the unit, students did a knowledge rating activity that introduced a lot of vocabulary terms associated with this science unit on ecosystems. In their science class they have begun studying the characteristics of ecosystems, so they should have some beginning concepts around this topic. In this activity, we’ll do a class brainstorm map centered on the concept of ecosystems. What words do they know related to this concept? How are they related?

**Description & Sequence**:

Using *Bubble.us* as a graphic organizer projected on the whiteboard, we’ll do a class brainstorm web with the word “ecosystems” in the center. Ask students “what are some words related to ecosystems?”. Small groups will brainstorm lists of words and record them on a group whiteboard. I’ll ask group spokesmen in turn to contribute thoughts which I’ll add to the map on Bubble.us, going around to each group until all agree that the important words are on the map. I’ll be adding ideas as they are generated, linking them as they suggest, but trying not to organize the web too much at this point. This should be pure brainstorming. As we brainstorm, I’ll also be instructing them in how to use Bubble.us themselves. After they have shared all their ideas, I’ll suggest some other words that they might consider adding if they have not been suggested already (ecology, environment, species, habitat, plants, animals, food, water, air, biodiversity, equilibrium, food chain)

**Pre-Assessment**: This lesson serves as another preassessment (group this time) for prior knowledge of vocabulary and concepts around ecosystems. After these first two lessons, I’ll share with the science teacher my thoughts regarding the class’ readiness for concept instruction.

How will you **Differentiate Instruction** for various learners?

* **Content** – present material visually and orally, use wait time in whole group discussion
* **Process** – discussion in small groups/pairs before whole group sharing

**Student-centered learning**:

* **Collaboration** – small group, whole group
* **Shared responsibility** – small groups create list, whole group responsible for complete brainstorm map

**Materials**:

* laptop and overhead projector
* whiteboards, markers, erasers for each group

**Resources**:

Kid’s Discover Ecology Teacher’s Guide

[Bubble.us](file:///\\Besserver01\groups\!StaffShared\Grade%205\DOTS\Word%20Study%20Lessons\Lessons\bubble.us)

**Vermont Standards & Grade Expectations Addressed**:

**R6: 6 Shows breadth of vocabulary knowledge through demonstrating understanding of word meanings or relationships by…**

• Describing words in terms of categories, functions, or features

• Selecting appropriate words or explaining the use of words in context, including content-specific vocabulary,  
 words with multiple meanings, or precise vocabulary R–6–3.2

**21st Century Skills including Technology**:

* Collaboration in small and large groups
* Exposure to online concept mapping tool (Bubble.us)

**Lesson Title**: Ecosystems Vocabulary Stations I

**Name of Corresponding Unit**: We’re All in This Together

**Creator**: Heather Estey

**Grade level(s**): 5/6

**Recommended Durtion**: 20-30 minutes per day/ 3 sessions

**Essential Question**: How do scientists use language to communicate important ideas?

**Specific Learning Goals for this lesson**:

* Students will know:
  + The definition of a biome
  + Community is a word with many shades of meaning
* Students will understand: Scientists use specific vocabulary to share ideas, learn, and communicate their message to others.
* Students will be able to:
  + Organize ecosystems concepts into meaningful categories
  + Use bubble.us as a graphic organizer to create an organized semantic web

**Lesson Overview**: In this series of lessons students will rotate through 3 different learning centers, engaged in group explorations with ecosystems vocabulary. All students will be part of a group which will rotate through each of the stations by the end of the 3 sessions.

**Description & Sequence**:

On the first day of this lesson series, I’ll review the Ecosystems concept map the class did in the previous lesson and engage them in a brief whole group discussion. What are the important words you picked? Why did you pick them? How are these words related to each other? Could you organize them in a way that would help you better understand how ecosystems work?

I’ll demonstrate again how to use bubble.us which they’ll be using at one of the stations. I’ll then give specific directions for expectations for cooperative group work (how do we make sure each person can do their best learning? How do we make sure each gets a chance to talk and to listen? What voice levels do we need in the room if 3 groups are all working? Who can help you if you get stuck? etc. ) For this activity they’ll be able to choose whom they work with, as long as they can form 3 fairly equal size groups within the classroom. If they have trouble independently forming groups, I’ll intervene and help with that process.

The learning stations will be set up around the room. There’ll be a sign at each explaining the directions. I’ll go to each station and explain the specific directions for that station. Groups will be assigned an initial station to begin at. For the next sessions they’ll move clockwise around the room until all groups have experienced each station.

* Semantic Map station – This station will be set up with a netbook. Students will open up the class Bubble.us concept map created by the class in the previous session (logged in and saved in teacher account). The group will take this saved concept map and edit it into a semantic web, sorting and categorizing vocabulary concepts, adding words, color coding, etc. They’ll print out a copy of their group’s semantic web to share later with the whole class, but not save their changes. (Unfortunately, bubble.us only allows the user to save a limited amount of maps.) The group will make sure the original class concept map is saved for the next group to work with.
* Major Biomes station – At this station students will play a card game with a partner from the group (student choice) involving matching descriptions of a particular biome to its picture/label card on a tic-tac-toe board. After they’ve played the game with a partner, there is an activity sheet to complete labeling true/false statements about biomes. The concept of biomes should be completely new for them so this will be fairly self-directed learning for them. I will explain in my directions to them that biome is a general term describing ecosystems that share characteristics (deserts, rainforests, lakes, etc.). The term ecosystem is much more specific. At this station will be posted pages from Kids Discover Ecology (p. 4-5) describing the different biomes for reference.
* Definition of Community station – At this station, groups will be given a sheet of blank poster paper and the task of creating a poster that shows the meaning/meanings of “community” to them. What does community look like? Are there different kinds of community? If the students don’t come up with these ideas on their own, I’ll guide them to think about community as it relates to an ecosystem (plants, animals, humans interdependent on each other…).

How will you **Differentiate Instruction** for various learners?

* **Content** – reading partners, representations (writing, drawing, technology)
* **Process** – technology mapping tool, art activity, game, choice of partners
* **Product** – creativity in the communications poster

**Student-centered learning**:

* Small group work at stations
* Guided inquiry
* Structured inquiry

**Materials**:

* Teacher laptop and overhead projector
* Netbook logged in to bubble.us account and class ecosystems concept map
* Stations directions posters
* Poster paper and drawing materials
* Kids Discover Ecology p. 4-5 poster

**Resources**:

* Kid’s Discover Ecology - Levels of ecology poster
* [Bubble.us](file:///G:\DOTS\Word%20Study%20Lessons\bubble.us)
* Teaching Vocabulary in All Content Areas- Semantic map activity, Semantic gradient activity
* Johnson, Sandy, Take It To Your Seat Vocabulary Centers: Grades 5-6, Evan-Moor Educational Publishers – Major Biomes activity

**Vermont Standards & Grade Expectations Addressed**:

**R6: 5 Identifies the meaning of unfamiliar words by…**

• Using strategies to unlock meaning (e.g., knowledge of word structure, including prefixes/suffixes and base words; or context clues; or other resources, such as dictionaries, glossaries, thesauruses; or prior knowledge) R–6–2.1

**R6: 6 Shows breadth of vocabulary knowledge through demonstrating understanding of word meanings or relationships by…**

• Identifying synonyms, antonyms, homonyms/homophones, shades of meaning, or simple analogies EXAMPLE (simple analogy): “parent is to child as cat is to kitten—parent: child as cat: kitten” R–6–3.1

• Describing words in terms of categories, functions, or features

• Selecting appropriate words or explaining the use of words in context, including content-specific vocabulary, words with multiple meanings, or precise vocabulary

**21st Century Skills including Technology**:

* Collaboration in small groups
* Online concept mapping tool used (Bubble.us)
* Creativity – community poster

**File Attachments**:

Directions for each station

Bubble.us Station



**Directions**:

* Open up the bubbl.us map we began together, saved in the Estey class folder. Save a copy with your group’s name (i.e. Zavadil Lucas Kenz Keyanna Sam) in that same folder.
* Working in your new file, add to and edit your map. Are there are other words about ecosystems that you should add? How can you group them? Can you add colors to categories? Your web should show how the different ideas are related to each other.
* Print out a copy of your web to share with the group.

**Major Biomes**

**Station**

** **

** **

1. Play ***Major Biomes Tic Tac Toe*** with a partner (or by yourself). The directions , game board, and cards are inside the folder.
2. After you’ve played the game, work on the ***activity sheet***. You may work with a partner on this if you’d like.
3. When you’ve finished your activity sheet, you may ***check your answers*** with the Answer Key. No fair cheating until you’ve done the activity sheet!
4. Read and study the ***poster*** from Kids Discover: Ecology. Does this information agree with that in the game? What is the same and what is different? Why?

Station

What does “community” mean to you? What kinds of communities are you a part of? What other kinds of community are there?

With your group create a poster to show your thinking. You may use crayons, markers, colored pencils, magazine pictures, etc. Don’t forget to think beyond the idea of community as just a group of people.

S T R E T C H your minds…

Creativity counts!

**Lesson Title**: Word Study - Three Facts and a Fib

**Name of Corresponding Unit**: We’re All in This Together

**Creator**: Heather Estey

**Grade level(s**): 5/6

**Recommended Duration**: 50 minutes

**Essential Question**: How do scientists categorize the levels of the environment?

**Specific Learning Goals for this lesson**:

* Students will **know**:
  + There are 6 different levels of ecology (individual, population, community, ecosystem, biome, biosphere)
  + Each level includes the levels below it.
* Students will **understand**: Ecologists study Earth’s environment at six different levels
* Students will **be able to**: define the vocabulary words *community, ecosystem, biome, biosphere, individual, population, species*

**Lesson Overview**:

Students in pairs will read and discuss together the article “Look Around” from Kids Discover Ecology. This article describes the 6 levels at which scientists study the environment. There is a great graphic illustration of these layers, along with captions describing them. Pairs will come together as a small group and create a list of 3 facts from the article (section called “6 Ways of Looking at Our Planet”), and 1 fib (fact with word or phrase altered to make it untrue). Groups leave their list of 3 facts and a fib (in random order) on the table. Each group rotates through to the other groups’ list and decides which one is the fib. At the end of the activity groups share out their guesses as to the fibs.

**Description & Sequence**:

1. Students are assigned to a small group. Each group divides into pairs. Pairs have a copy of the article to read and discuss together. Pairs then come back together into a small group. Groups have a large post-it on which they write 3 facts and a fib. Synthesis of the article text and graphics is required to make sure they have detailed facts and fibs (the best ones to trick their classmates!)They make sure to check their handwriting, grammar and spelling so that other groups can read and understand their sentences. They leave their 3 Facts and a Fib post-it on a desk.

|  |
| --- |
| **Group 1** |
| 1. Fact |
| 1. Fib |
| 1. Fact |
| 1. Fact |

1. Groups make a recording sheet for their guesses on the other groups’ facts and fibs. Group 1 moves to Group 2’s post-it (2 to 3, 3 to 4, 4 to 1) with their articles in hand. They read together the facts and fibs and decide which one is the fib, marking it on their recording sheet. When all the groups are finished, they rotate to the next group in sequence.

|  |
| --- |
| **Group 1 Guesses** |
| Group 1 fib: ours – don’t tell! |
| Group 2 fib: |
| Group 3 fib: |
| Group 4 fib: |

1. Groups in turn share out their guesses, and the creating group reports the actual fib. Class discussion ensues about these facts and fibs.
2. Students will complete the Ecosystem worksheet (pdf file linked below) in class or as homework as a formative assessment.

**Formative Assessment**:

Anecdotal notes about group and individual understanding of ecosystems vocabulary

[Ecosystem worksheet pdf file](http://www-bioc.rice.edu/pblclass/6th%20grade/Biology/ecosystems/Ecosystem%20Worksheet.pdf)

How will you **Differentiate Instruction** for various learners?

* **Content**: reading partners, visuals and text, teach part-to-whole then whole-to-part
* **Process**: partner work then small group work

**Student-centered learning**:

* **Choice** of partners within small group
* **Rigor** – challenging task to synthesize text into complex facts and fibs
* **Shared responsibility** for success of small group

**Inquiry-based learning**:

Guided inquiry

**Materials**:

* Kid’s Discover Ecology “Look Around” articles – 1 per pair
* Post-its - 1 large lined per group for Facts and Fib, 1 smaller for group guesses

**Resources**:

Kids Discover Ecology

**Vermont Standards & Grade Expectations Addressed**:

*R6: 7 Uses comprehension strategies (flexibly and as needed) while reading literary and informational text.*

**21st Century Skills including Technology**:

* **Collaboration**
* **Critical Thinking skills** – synthesizing information

**Files Attached:**

Ecosystems Worksheet (pdf file)

**Lesson Title**: Word Study – Vocabulary Notebook

**Name of Corresponding Unit**: We’re All in This Together

**Creator**: Heather Estey

**Grade level(s**): 5/6

**Recommended Duration**: 30 minutes

**Essential Question**: What words are important to know to be able to communicate science ideas?

**Specific Learning Goals for this lesson**:

* Students will **know**:
  + The word study class routine of recording important vocabulary words and their meanings
  + The meanings of the vocabulary words added to the notebook in this lesson
  + Dictionaries (print and online) are one source to find meanings of words
* Students will **understand**:
  + Recording vocabulary meanings and using the words in sentences in context helps us to learn word meanings.
* Students will **be able to**:
  + Create a definition for a vocabulary word in their own language and record it in the table
  + Create a sentence that uses the vocabulary word in context and record it in the table
  + Look up meanings of vocabulary words in print and online dictionaries

**Lesson Overview**: In this lesson the Word Study Binder will be introduced. This will be a 3-ring binder containing two sections. One section will contain a notebook where students will be recording the word sort activities they will be doing in leveled spelling groups. The other section will contain loose pages containing work focused on vocabulary instruction. This particular lesson introduces the Vocabulary List pages (which will be created by the class as Google Docs and later printed for their notebooks) and how to complete them. We’ll do this by beginning a Google Doc with the Ecosystems content vocabulary we have learned so far in the unit. As we go through the unit we’ll be adding other vocabulary words as they are learned. This process will continue throughout the year for all vocabulary learned in Word Study class, with new Google Docs created for each content unit, and as needed for other categories of words (descriptive adjectives, etc.)

**Description & Sequence**:

* Open up the Google Doc I’ve created to hold this class’ Ecosystems Vocabulary words and project it on the board for the class. Share the example word, meaning, sentence.

|  |  |  |
| --- | --- | --- |
| **Word**: cooperation | **Meaning**: working together with others to achieve a goal | **Sentence**: Our word study class showed cooperation in creating meanings for our vocabulary words and adding them to this Google Doc. |

* Together as a class list the words we’ve studied so far. The first word could be “ecosystems”. Record this in the first box. Then have a class discussion about the meaning of this word. We’ll be writing it on the sheet in language that we all understand; we’re looking for the meaning of the term, not a dictionary definition. What resources do we have to find out the meaning if we don’t know? (dictionaries of various types including print and online – dictionary.com).
* Do a short (5 minutes!) discussion of looking up a word in the dictionary, but focus on finding the meaning of the word as we’ll be using it in science. Do this with a few printed dictionaries in the classroom of various levels of complexity, and briefly show how to use the website *dictionary.com* (linked on our class website) as well.
* Come up with a class meaning for “ecosystems” and record it in the meanings section of the Google Doc. Then do the same for a sentence that uses the word ecosystems in context in a way that helps use understand what it means.
* Take the remaining words studied so far, and assign each word to a pair (or small group) to create a meaning and sentence. If time allows, pairs/groups may do this directly on netbooks on the class Google Doc. If not, groups may write their meanings on whiteboards and share out to the class later, while I record on the projected class Google Doc.
* This Google Doc will be shared with the Science teacher as well as the other content instructors so they may be aware of the vocabulary terms learned so far by each class as they progress through the unit. When the class has a substantial list of words created, I’ll make a copy for each student to add to their Word Study binder. When all words have been defined they’ll replace this with a final document; this should be available to them as they work on their summative assessment project in science class.
* Students will be given a blank vocabulary list to keep in their Science folders. When they come to a vocabulary word discussed in Science class, they can add a meaning then. When they come to Word Study class, we’ll add to this Google Doc any new words they’ve encountered.

How will you **Differentiate Instruction** for various learners?

* **Process** – scribing allowed, preferential seating for those needing to sit near the whiteboard, graphic organizer to record information, tech buddies, work in pairs to define meanings/sentences
* **Product** – choice of hand-written or Google Doc option

**Inquiry-based learning**: structured inquiry

**Materials**:

* Netbooks for Google Docs work or white boards for hand-written work
* Google Doc projected on whiteboard with teacher laptop and projector
* Selection of classroom dictionaries (elementary, high school, college levels, small “pocket” dictionaries)

**Resources**:

Dictionary.com - <http://dictionary.reference.com/>

Google Docs – docs.google.com

**Vermont Standards & Grade Expectations Addressed**:

**R6: 5 Identifies the meaning of unfamiliar words by…**

• Using strategies to unlock meaning (e.g., knowledge of word structure, including prefixes/suffixes and base words; or context clues; or other resources, such as dictionaries, glossaries, thesauruses; or prior knowledge) R–6–2.1

**21st Century Skills including Technology**:

Using online reference tools (dictionary.com)

Using Google Docs to collaborate

**File Attachments** – Ecosystems Vocabulary for Science Notebooks

**Name:**

**Class:**

**Ecosystems Vocabulary**

*Write the meanings for these words when you discuss them in Science class. When you come to Word Study class we’ll add them to our Google Doc.*

|  |  |
| --- | --- |
| **Word** | **Meaning** |
| Abiotic |  |
| Biodiversity |  |
| Biome |  |
| Biosphere |  |
| Biotic |  |
| Carnivore |  |
| Community |  |
| Consumers |  |
| Decomposers |  |
| Ecology |  |
| Ecosystem |  |
| Environment |  |
| Equilibrium |  |
| Habitat |  |
| Herbivore |  |
| Invasive |  |
| Native |  |
| Omnivore |  |
| Organism |  |
| Photosynthesis |  |
| Phytoplankton |  |
| Producers |  |
| Species |  |
| Watershed |  |
| Zooplankton |  |

**Lesson Title**: Word Study – It’s All Greek (and Latin) To Me I

**Name of Corresponding Unit**: We’re All in This Together

**Creator**: Heather Estey

**Grade level(s**): 5/6

**Recommended Duration**: 4 days, each session 30-50 minutes long

**Essential Question**: How does examining the morphology of a word help us to understand its meaning?

**Specific Learning Goals for this lesson**:

* Students will **know:**
  + meanings of the roots and affixes eco, geo, bio, graph, logy
  + roots and affixes have meaning
  + basic classroom routines for word study/spelling
* Students will **understand**: Examining morphemes in words can help us know the meaning
* Students will **be able to:** 
  + predict meaning of new word given familiar root or affix
  + sort words into categories based on common prefixes, suffixes, or roots

**Lesson Overview**:

In this series of lessons we’ll introduce the word study/spelling routines that students will be using in their leveled spelling groups. We’ll introduce sorting words routines, routines for recording work in their word study notebook and common word study activities. This work will be done both as a whole class and in pairs or small groups, modeling routines by using the Greek/Latin roots and affixes eco, geo, bio, graph and logy which are important features in our ecology vocabulary words. Knowing the meanings of these morphemes will help students to uncover meanings of many words new to them. Typical classroom word study routines are described in the attached file: Word Study activities.

**Description & Sequence**:

Day 1 -

* Remind the class that “Word Study” class involves two different kinds of work with words – thinking about how words are spelled and common rules for this, and thinking about what words mean – vocabulary. We have a Word Study notebook in which we’ll be recording much of this spelling and vocabulary work. We’ll begin learning the routines we’ll use in this class (very similar to ones they’ve used in prior grades) by doing a whole class sort with words that contain some Greek and Latin roots and affixes (parts of words) that are really important to our ecosystems unit.
* Pass out Word Study binders and notebooks to all students (already labeled with names). Discuss how we’ll be using these binders (notebook for word sort activities done with spelling groups and binder section for pages with vocabulary work).
* We’ll begin this sort together by working together on a Google Doc template begun with the headers eco, geo, bio, logy, and graph.

|  |  |  |  |
| --- | --- | --- | --- |
| Eco | Geo | Bio | Graph |
| Logy |  |  |  |

I’ll project this on the board. What other words do we know that contain these word parts? What do you think these word parts mean? Ask the class for ideas, and choose words containing these parts that share meaning. Suggested words:

* + **eco** - ecosystem, ecology, economy (Greek *oikos* - place to live)  
    **logy** - ecology, geology, biology, morphology - study of (Greek *logos* - study of )  
    **graph** - geography, graphic, graph, grapheme, orthographic, homograph, photograph, biography  (Greek *graphikos, Latin graphicus* -  to write)  
    **geo** - geology, geography, geode (Latin *geo* - the earth)  
    **bio** - biology, biome, biotic, abiotic, biography, biosphere, autobiography, biodiversity (Greek *bios* - life
* As the class brainstorms words, add them to the list, working towards a good representation of words with all the roots and affixes – filling up the template (up to 24 words total). Pick a key word for each root/affix and make that bold, along with the roots/affixes. Convert this Google Doc to Word and print out a copy for each student.
* Distribute word study notebooks to each. Have them set up the first sort (title at top of page, date in margin, title of activity – “Word Walk” in margin).
* Word Walk – Students scribble on the back of their word list with a crayon (different colors for neighbors so words don’t get mixed up). They then cut out these words and sort them into columns on their desks according to root/affix. Use the key word for each column as a header along with the related root/affix. After all have sorted their words individually on their desk, share out as a class which words should go in each column. Model recording this sort on the Google Doc, as students copy it into their notebooks.
* Homework – set up notebook page to record SAW sort (Sort, Alphabetize, Write) with the words, and do one or two columns together as time allows. Their homework will be to finish this work for homework. They’ll save their word cards in the pocket in the folder to use for homework and the remaining classwork activities with this sort.

Day 2 –

* Share out homework SAW sort.
* Review the meanings of the words in their lists. What do all the eco words have in common? What do you think eco means? What does each word with eco mean? Repeat with the other roots and affixes. Record this rule (eco means “place to live”, geo means “the earth”, etc.) in their notebooks. Add ecosystems vocabulary words in the list to the class Google Doc Ecosystems Vocabulary pages, noting their meanings and using them in sentences.
* Buddy sort – introduce routines for a buddy sort. Students choose a partner to work with. They use one set of words and set up the headers and key words in front of them. One partner shows a word, the other points to the column where the word goes, and the “show-er” places it there, or makes a correction. They do this for all the words, then switch. Some pairs may decide to read aloud the words rather than show them (blind sort).

Day 3 –

* Open sort – Introduce routines for open sorting. Students in pairs will decide on other ways to sort this group of words. Do a whole group model for one kind of sort (placement of key root/affix – beginning, middle, or end of word). Show this sort with word cards with the document camera, and record the sorting rule at the bottom of the sort (e.g. Placement of the key root/affix – beginning, middle, end) Ask for ideas from group of other ways to sort words (by concept relationships, number of syllables, etc.) Steer students towards sorts that focus on the meanings of the words for this particular sort.
* Set up notebooks for open sort (label in margin with date, activity).In pairs students will decide on an open sort and record it in their notebooks. They will write the sorting rule under the sort. Pairs share out as time allows.

Day 4 –

* Meaningful sentences - Model routines for creating meaningful sentences or stories with the students. They’ll be choosing a number of their words and using them in meaningful sentences. Model meaningful versus boring sentences. Encourage sophisticated, descriptive language. Some students will choose to write a longer story with their words rather than individual sentences - terrific!
* Students individually, or in pairs, will write meaningful sentences that include at least 2 vocabulary words in each. Share out examples as time allows.
* Homework – Assign homework of writing 5 new sentences (or include at least 10 words in a story) that use the vocabulary words in a meaningful way. Remind them that spelling, and GUM count. They will record their sentences in their word study/spelling notebooks.

How will you **Differentiate Instruction** for various learners?

* **Content** – partner work with word sorts, visual/auditory modes
* **Process** – like-readiness and mixed-readiness partnering, independent and group work
* **Product** – tiered product (sentences/story)

**Student-centered learning**:

Students create word list to use for this sort

Choice of partners, products

**Inquiry-based learning**:

Structured and guided inquiry (buddy sort, open sort)

**Materials**:

* Word study notebooks
* Google Doc template for word sort for class
* Dictionaries
* Ecosystems Vocabulary Google Doc for class word list

**Resources**:

* Bear, Donald R., Invernizzi, Marcia, Templeton, Shane, Johnston, Francine, Words Their Way: Word Study for Phonics, Vocabulary and Spelling Instruction, Pearson Education, 2012.
* Ganske, Kathy, Mindful of Words: Spelling and Vocabulary Explorations 4-8, The Guilford Press, 2008.

**Vermont Standards & Grade Expectations Addressed**:

**R6: 5 Identifies the meaning of unfamiliar words by…**

• Using strategies to unlock meaning (e.g., knowledge of word structure, including prefixes/suffixes and base words; or context clues; or other resources, such as dictionaries, glossaries, thesauruses; or prior knowledge) R–6–2.1

**21st Century Skills including Technology**:

Collaborating with Google Docs

Inquiry

**File Attachments**:

* Word Study Activities list

Word Study Activities and Terms

**Word walk** –With each small group, to introduce week’s words:

1. Teacher does guided exploration of word patterns for this week (read words, discuss meaning of any unfamiliar words)
2. Teacher begins modeling word sorting under key words, reading each as it is laid down. This becomes guided practice as sort continues. Students join in to determine where a new word goes. Correct mistakes as needed.
3. Discuss the completed categories.
4. Note: Sorts can be made by sound, by pattern, by meaning, or a combination.

**Sorts**:

* **Timed sort (speed sort)** – Students time themselves, or each other, as they sort their words or pictures using a stopwatch or clock. Students try to beat their own time.
* **SAW Sort** – Students *sort* their words, arrange each column of words in *alphabetical* order, and *write* down the sort in their journal.
* **Writing sort** – Often follows a word sort. Students record their word sorts into their journal or paper.
* **Buddy sort** –Leader lays down a key word from each category as a header, then reads the remaining words aloud one by one. The student places the card in the correct category.
* **Blind sort (no peeking sort)** – Same as buddy sort, but the leader reads aloud the word, and the student points to the correct category. The student does not see the word card.
* **Concept (meaning) sort** – Students sort their words by meaning.
* **Syllable types sort** – Students sort their words by syllable type of one syllable

**Other Activities**

**Base words activity** – Students circle the base words from their word list.

**Bases and affixes activity** – Students divide their words into prefix/base/suffix

**Plurals/Endings activity** – Students take words from their word list and add plurals and/or endings (i.e. -ed, -ing, -ly) to the base word.

**Prefixes/Suffixes activity** – Students add prefixes and/ or suffixes to base words from their word list.

**Syllable Division activity** – Students divide their words into syllables (can label syllables by type also)

**Word hunt** – Students hunt for words in previously read text that contain the spelling feature examined during the word sort.

**Assessment:**

**Spelling test** – Do this as a writing sort. Teacher chooses 10 of the words from the list and dictates them to students. Students record words on a blank word sort sheet.

**Dictation sentences** – Teacher dictates five meaningful sentences including targeted words and spelling features (and a variety of punctuation, proper nouns, etc.); students record these on the back of their spelling test. Students may be asked to generate their own bonus sentence for several of the words.

**Terms:**

**Word sort** – Students group words into categories. It involves comparing and contrasting within and across categories, often cued by key words (header words) placed at the top of each category.

**Closed/open sorts** – Closed sorts classify words into predetermined categories. In an open sort, students determine their own categories for sorting.

**Oddball** – An oddball is a word that does not fit the targeted letter sound, pattern, or meaning features being studied.

**Lesson Title**: Word Study - Voracious Vocabulary

**Name of Corresponding Unit**: We’re All in This Together

**Creator**: Heather Estey

**Grade level(s**): 5/6

**Recommended Duration**: 30 minutes

**Essential Question**: How does examining the morphology of a word help us with its meaning?

**Specific Learning Goals for this lesson**:

* Students will **know**:
  + meanings of the root –vore and prefixes –carni, -omni, -herbi
  + roots and affixes have meaning
  + how to compare/contrast meanings of words by analyzing their morphemes
* Students will **understand**: Examining morphemes in words can help us know the meaning
* Students will **be able to**:
  + predict meaning of new word given familiar root or affix

**Lesson Overview**: In this lesson, students will analyze the vocabulary words carnivore, omnivore and herbivore. What do they mean? What are the morphemes in each word and how do those morphemes help us to figure out the meaning? We’ll complete a graphic organizer for each word which will include a definition, morpheme analysis, related words, and graphic examples of the concept. They’ll have the choice to do this activity with the netbooks in a Word document template to which they’ll add appropriate images from a Google image search or to do by hand on a paper copy of the organizer.

**Description & Sequence**:

Begin with a whole group discussion of the words carnivore, omnivore and herbivore. What do they mean? What is the same/different about them? ( carni, omni, herbi, vore). Explain that we’ll be analyzing these words and the morphemes inside them to understand their meaning.

Students choose to do the project on paper or with a netbook. Those who wish to use a netbook get one out, log on, and open up a copy of the saved “-vore Words” file (saved in class folder on network), and save a new copy to work on in their own My Documents folder. Others will use a paper copy of the organizer.

Explain the different sections of the organizer using the projector on the whiteboard:

|  |  |
| --- | --- |
| Word and Meaning | |
| Morpheme Analysis | Related Word |
| Examples | |

* Meaning section – write a meaning for the word
* Morpheme analysis – break the word up into its morphemes ( carni/omni/herbi + vore)
* Related words – list other words containing this prefix
* Examples
  + With netbooks search for images of that word with Google Images (set advanced image search to strict filtering and use images labeled for reuse). Copy and paste a few images into your own My Pictures folder. Then copy and paste into your organizer.
  + On paper draw images for that word, using crayons or colored pencils. You may draw scenes that illustrate the meaning.

Students will save this document in their network My Documents folder, or keep the physical document in their Word Study binder.

**How will you Differentiate Instruction for various learners?**

**Content** – support with vocabulary understanding for some (examples of carnivores, etc.)

**Process** - choice of paper or technology, tech buddies

**Product** – print or Word document

**Student-centered learning**:

* **Relevant**
* **Choice** in process and product

**Inquiry-based learning**:

Guided inquiry

**Materials**:

-vore Words template

Netbooks

Drawing materials

**Resources**:

Google Images - <http://www.google.com/imghp?hl=en&tab=wi>

**Vermont Standards & Grade Expectations Addressed**:

**R6: 5 Identifies the meaning of unfamiliar words by…**

• Using strategies to unlock meaning (e.g., knowledge of word structure, including prefixes/suffixes and base words; or context clues; or other resources, such as dictionaries, glossaries, thesauruses; or prior knowledge) R–6–2.1

**21st Century Skills including Technology**:

Creativity/Innovation

Using Google Images to search, insert into Word doc

**File Attachments**:

-vore Words sort

* Vore Words

|  |  |
| --- | --- |
| Word and Meaning  carnivore - | |
| Morpheme Analysis | Related Words |
| Examples | |

|  |  |
| --- | --- |
| Word and Meaning  herbivore – | |
| Morpheme Analysis | Related Words |
| Examples | |

|  |  |
| --- | --- |
| Word and Meaning  omnivore - | |
| Morpheme Analysis | Related Words |
| Examples | |

**Lesson Title**: Word Study – An Ecosystems Tale

**Name of Corresponding Unit**: We’re All in This Together

**Creator**: Heather Estey

**Grade level(s**): 5/6

**Recommended Duration**: 50 minutes/ 3 sessions

**Essential Question**: How do we use content vocabulary in a narrative?

**Specific Learning Goals for this lesson**:

* Students will **know:**
  + scientific vocabulary can be used to build a fictional story
  + meanings of ecosystems vocabulary
* Students will **understand**:
  + how to apply their content vocabulary in a new fictional context
* Students will **be able to**:
  + apply ecosystems vocabulary in context in narrative form
  + write a narrative
  + apply spelling, grammar, usage and mechanics rules to a short writing piece

**Lesson Overview**: Students roll Story Cubes dice that contain graphics (various pictures suggesting nouns, verbs, adjectives). They need to write a short story that involves two of these graphics and at least 5 of their ecosystems vocabulary words. The words need to be used accurately in a realistic context. They will write this story independently, though they’ll be encouraged to brainstorm ideas, share drafts etc. with peers for feedback. When the stories are complete, students will share them on pages of our team wiki. They will have the option of adding an Audacity voice recording of the story to the wiki page as well.

**Description & Sequence**:

1. Day 1: Students take turns rolling 2 of the Story Cubes dice. They may reroll until they get 2 graphics that inspire them. They’ll combine these two ideas along with at least 5 of their ecosystems vocabulary words in a short story. They’ll brainstorm ideas and share with peers, then write their rough draft. Options for this writing piece will include scaffolded writing frames and scribing by a special educator. Spelling reference tools will be available.
2. Day 2: After their rough draft is completed, they’ll peer conference (or conference with me or another teacher), edit/revise and do a final copy. I’ll remind them that I’ll be assessing their writing for ecosystems vocabulary as well as spelling and G.U.M.
3. Day 3: They’ll type their final copy onto a Google Doc and share it with me for grading.
4. Later on they will upload it to our wiki. Adding graphics and/or an Audacity recording of their story will be an option. The accommodation of an adult (or peer) typing their story onto the wiki (and Google Doc) will be provided.
5. These wiki pages will be shared with members of our wiki – all students and teachers on our 5/6 team, parents, administrator, other school staff.

**Formative Assessment(s**):

This is a formative assessment for the ecosystems vocabulary studied so far. What vocabulary do they choose for their story? Do they use the terms accurately in their story? Does the context for the words make sense?

How will you **Differentiate Instruction** for various learners?

* **Content** – choice of content vocabulary and story cube words
* **Process** – dictation/scribing available, scaffolded writing frames, choose level of challenge (add graphics, audio to wiki page), peer conferencing
* **Product** – scribing available, typing available, addition of graphics and/or audio to wiki page

**Student-centered learning**:

Choice in topic, level of support, level of challenge

**Inquiry-based learning**:

Structured inquiry

**Materials**:

Story Cubes dice

Netbooks

Vocabulary notebooks

An Ecosystem Tale directions and scoring rubric

**Resources**:

Rory’s Story Cubes dice game

PB Wiki

**Vermont Standards & Grade Expectations Addressed**:

**W6: 2 In independent writing, students demonstrate command of appropriate English conventions by…**

• Applying rules of standard English usage to correct grammatical errors

• Applying basic capitalization rules

• Using punctuation to clarify meaning

W6: 3 In independent writing, students demonstrate command of conventional English spelling by…

• Independently applying spelling knowledge in proofreading and editing of writing

• Correctly spelling grade-appropriate, high-frequency words, including homonyms and homophones and applying syllable division, morpheme, and affix spelling patterns/rules to new situations

• Correctly spelling grade-appropriate word groups that share a common root (e.g., “report,” “imported,” “transportation,” “portable”)

**W6: 11 In written narratives, students organize and relate a story line plot/series of events by…**

• Creating a clear and coherent (logically consistent) story line

• Using transition words/phrases to establish clear chronology and enhance meaning

• Establishing context, problem/conflict/challenge, and resolution, and maintaining point of view (1st person, 3rd person, or omniscient)

**R6: 6 Shows breadth of vocabulary knowledge through demonstrating understanding of word meanings or relationships by…**

• Identifying synonyms, antonyms, homonyms/homophones, shades of meaning, or simple analogies R–6–3.1

• Describing words in terms of categories, functions, or features

• Selecting appropriate words or explaining the use of words in context, including content-specific vocabulary, words with multiple meanings, or precise vocabulary R–6–3.2

**21st Century Skills including Technology**:

Collaborating (peer conferencing)

Wiki use – creating pages, uploading files

Audacity for audio recording

Google search for images

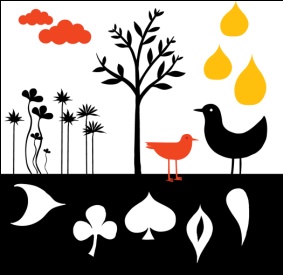
**File Attachments**:

An Ecosystems Tale directions/scoring rubric

Name:

Class:

**An Ecosystems Tale**

****

**Directions**: Roll the StoryCubes dice to find 2 graphics that spark an ecosystems story idea for you. Combine those two ideas with at least 5 of your Ecoysystems Vocabulary words to create an ecosystems tale. You may be creative, but make sure you use the vocabulary words in a realistic way. (I want to know if you understand what these words really mean!). You may write your rough draft on paper or on your netbook. Save your final copy as a Google Doc and share it with me. Have fun!

**Scoring Rubric**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Criteria** | **Above and Beyond – 4** | **Got it! – 3** | **Almost There – 2** | **Just Getting Started - 1** |
| **Ecosystems Vocabulary** | The story contains more than 8 vocabulary words accurately and in a context that makes sense. | The story contains 5-8 vocabulary words accurately and in a context that makes sense. | The story contains less than 5-8 vocabulary words accurately or in a context that makes sense. | The story contains little evidence of accurate use of vocabulary words. |
| **Creativity** | The story contains many creative details and/or descriptions that contribute to the reader\'s enjoyment. The author has really used his imagination. | The story contains a few creative details and/or descriptions that contribute to the reader\'s enjoyment. The author has used his imagination. | The story contains a few creative details and/or descriptions, but they distract from the story. The author has tried to use his imagination. | There is little evidence of creativity in the story. The author does not seem to have used much imagination. |
| **Spelling** | There are no errors in grade level spelling errors and above grade level words are spelled accurately. | Grade level spelling words are all spelled accurately. | There are 2-3 errors in grade level spelling words. | There are more than 3 errors in grade level spelling words. |

**Lesson Title**: Word Study – It’s All Greek (and Latin) to Me II

**Name of Corresponding Unit**: We’re All in This Together

**Creator**: Heather Estey

**Grade level(s**): 5/6

**Recommended Duration**: 20-30 minutes, 4 sessions

**Essential Question**: How does examining the morphology of a word help us with its meaning?

**Specific Learning Goals for this lesson**:

* Students will **know:**
  + meanings of the roots and affixes equi, de, nat, photo, pro, con
  + roots and affixes have meaning
  + basic classroom routines for word study/spelling
* Students will **understand**: Examining morphemes in words can help us know the meaning
* Students will **be able to**:
  + predict meaning of new word given familiar root or affix
  + sort words into categories based on common prefixes, suffixes, or roots

**Lesson Overview**:

This series of lessons will be very similar to the series described in my previous lesson: Greek and Latin Roots I. We’ll introduce a new series of roots and affixes to explore. This sort will continue the introduction of word study/spelling routines. This particular sort will work on the meanings of the prefixes and roots equi, de, nat, pro, con and photo, which all occur in our ecosystems vocabulary words.

Roots/affixes and suggested words:

**pro** – producer, promote, professional (Latin *pro* – for, forward)

**con** – consumer, concave, convex, consider (Latin *con* – with)  
**-vore** - carnivore, omnivore, herbivore, voracious (Latin *vorare* - devour, swallow)  
a-abiotic, amorphous (Greek *a* - without)

**equi** - equilibrium, equivalent, equidistant, equal, equilateral, equiangular (Latin *aequi* - equal)  
**nat** - native, non-native, natural, nature (Latin *natus* - birth)  
**de** - decomposer, destroy, decompress, destress, (Latin *de* - down, off, not)

**photo** - photosynthesis, photograph (German *photo* – light)

We’ll also highlight new ecosystems vocabulary words learned up to this point and add them to the class Ecosystems Vocabulary Google Doc.

**Description & Sequence**:

The sequence will be similar to that introduced in the previous series of lessons.

1. Introduce roots/affixes and key words on a class Google Doc.

|  |  |  |  |
| --- | --- | --- | --- |
| Equi | De | Nat | Pro |
| Con | Photo |  |  |

1. Group adds key words and other related words to the list. I save this Google Doc and print copies for all.
2. Word Walk – cut words and sort on desk. Record in journal.
3. SAW sort for homework
4. Discuss meanings and add rule for roots/affixes meanings to notebook
5. Buddy sort
6. Open sort with partner – record in journal with sorting rule
7. Meaningful sentences/story
8. Add the routine of word hunts. In this activity students search for words containing the key roots/affixes in text. For this particular sort I’ll provide issues of the science magazines Kids Discover and National Geographic Kids, ecosystems content books, etc. for students to use. Students with partners will search in text for words and add them to a sorting frame in their word study/spelling notebooks. Students will share out to the group words they’ve found and all will add to their own lists new words.

**Formative Assessment**:

* Give each student a new copy of the sort list and have them write the words in the correct column on the Assessment sheet (attached).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Equi | De | Nat | Pro | Con | Photo |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

* They’ll just be listening for the roots/affixes and entering them in the correct column. Correct spelling will not be expected (as long as I can recognize the word!)
* On the back they give a meaning for each root/affix.

|  |
| --- |
| Equi - |

* Assess their meaningful sentences – do they demonstrate understanding of the content vocabulary? If not, review meanings of the vocabulary words with individuals or the whole group if needed.

How will you **Differentiate Instruction** for various learners?

* **Content** – partner work with word sorts and word hunt, visual/auditory modes
* **Process** – like-readiness and mixed-readiness partnering, independent and group work
* **Product** – tiered product (sentences/story)

**Student-centered learning**:

Choice of partners, products

Group collaboration to create word list

**Inquiry-based learning**:

Structured and guided inquiry (buddy sort, open sort, word hunt)

**Materials**:

* Word study notebooks
* Word sort Google Doc
* Ecosystems Vocabulary Google Doc
* Ecosystems-related issues of Kids Discover, back issues of National Geographic Kids (multiple copies), Ecosystems content books

**Resources**:

* Bear, Donald R., Invernizzi, Marcia, Templeton, Shane, Johnston, Francine, Words Their Way: Word Study for Phonics, Vocabulary and Spelling Instruction, Pearson Education, 2012.
* Ganske, Kathy, Mindful of Words: Spelling and Vocabulary Explorations 4-8, The Guilford Press, 2008.

**Vermont Standards & Grade Expectations Addressed**:

**R6: 5 Identifies the meaning of unfamiliar words by…**

• Using strategies to unlock meaning (e.g., knowledge of word structure, including prefixes/suffixes and base words; or context clues; or other resources, such as dictionaries, glossaries, thesauruses; or prior knowledge) R–6–2.1

**21st Century Skills including Technology**:

Collaborating with Google Docs

Inquiry

**File Attachments**:

Equi de pro con nat photo Assessment recording sheet

|  |  |  |
| --- | --- | --- |
| **Equi** | **De** | **Pro** |
| **Con** | **Nat** | **Photo** |

**Name:**

**Class:**

**Assessment for equi/de/pro/con/nat/photo**

1. Write your words as I say them in the correct columns. Use your best spelling skills to write them.

2. What do these roots and affixes mean?

Equi- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

De - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Photo - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Nat- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Pro - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Con - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Lesson Title**: Word Study – Choose Your Own Roots and Affixes Adventure

**Name of Corresponding Unit**: We’re All in This Together

**Creator**: Heather Estey

**Grade level(s**): 5/6

**Recommended Duration**: 20-30 minutes

**Essential Question**: How does examining the morphology of a word help us with its meaning?

**Specific Learning Goals for this lesson**:

* Students will **know**:
  + roots and affixes have meaning
  + roots and affixes can be combined in various ways to create new meaning
* Students will **understand**: Examining morphemes in words can help us know the meaning
* Students will **be able to**:
  + predict meaning of a new word given familiar root or affix

**Lesson Overview**: In this lesson students will be able to make a choice about how to review their understanding of roots and affixes. They’ll be able to choose from card games, online games, word building activities with tiles, and worksheet packets with roots/affixes activities. They’ll have the choice of working alone, with a partner, or in a small group. In this lesson students will learn many different activities that will be available as choice activities for them throughout the year when they finish word study classwork, or when they have free academic choice time.

**Description & Sequence**:

These are the choices to be offered:

* Small group games – Roots and Prefixes Bingo, Prefix Bingo, Assimile (all games have self-explanatory directions and required pieces)
* Word Tiles games – A bag contains colored tiles showing prefixes, roots, and suffixes – each morpheme type in a separate color. Students choose 3 color tiles to create a new word, real or invented. They then write down the new word and its meaning on a recording sheet.
* Online games (with netbooks) –
  + Rooting Out Words –This is a game on Funbrain.com with various levels of complexity where you help Remainder the Dog gather enough mushrooms to sell at the market by uncovering the roots of words. <http://www.funbrain.com/roots/index.html>
  + Spelling City.com – At this site students log in to our class account and choose from a variety of games and activities that work with the vocabulary list that I have entered in. The games and activities focus on spelling and vocabulary strategies. <http://www.spellingcity.com/>
* Vocabulary worksheet packets – reproducible packets with activities centered around specific roots and affixes (crossword puzzles, matching, cloze sentences, etc.)

I’ll go over all the choices being offered (how to play the games, access the websites, etc.). Then students will make their choice on our choice board (magnetic white board listing all the choices offered. Students move their name magnet under their choice.

How will you **Differentiate Instruction** for various learners?

* **Process** – choice to work alone, with a partner, or small group; choice of mode of learning (visual, written, online game, interactive game – with a human!)

**Student-centered learning**:

Choice, collaboration

**Inquiry-based learning**:

Guided inquiry

**Materials**:

* Prefix, Suffix, and Root Plastic Tiles and Prefix, Suffix, and Base Word Plastic Tiles (Really Good Stuff)
* Assimile, Prefix Bingo, Roots and Prefixes Bingo (teacher-made games)
* Netbooks
* Vocabulary Learning Packets copied from Vocabulary Packets: Prefixes and Suffixes

**Resources**:

* Onish, Liane B., Vocabulary Packets: Prefixes and Suffixes, Scholastic,2010.
* <http://www.spellingcity.com/>
* <http://www.funbrain.com/roots/index.html>

**Vermont Standards & Grade Expectations Addressed**:

**R6: 5 Identifies the meaning of unfamiliar words by…**

• Using strategies to unlock meaning (e.g., knowledge of word structure, including prefixes/suffixes and base words; or context clues; or other resources, such as dictionaries, glossaries, thesauruses; or prior knowledge) R–6–2.1

**21st Century Skills including Technology:**

* Collaboration
* Creativity
* Using online games for learning

**Lesson Title**: Word Study - Ecosystems Vocabulary Sort it All Out

**Name of Corresponding Unit**: We’re All in This Together

**Creator**: Heather Estey

**Grade level(s**): 5/6

**Recommended Duration**: 20-30 minutes, 2 sessions

**Essential Question**: What vocabulary words do scientists use to share ideas and learn about ecosystems?

**Specific Learning Goals for this lesson**:

* Students will **know:**
  + The meanings of all 25 ecosystems vocabulary words
  + Words can be sorted by concept in various ways
* Students will **understand:**
  + Scientists use particular terms to describe ecosystems concepts.
* Students will **be able to**:
  + sort their ecosystems vocabulary words by various ecosystems concepts
  + define all the vocabulary words

**Lesson Overview**: In this sort the students will use their entire vocabulary list (25 words) to sort as concept words. There won’t be headers or key words given. This will serve as a review of their understanding of all the ecosystems vocabulary being used in science class and studied in word study class.

**Description & Sequence:** Students will be given the printed sort of all their ecosystems vocabulary words.They’ll add the new terms on this list to our class Ecosystems Vocabulary Google Doc. Students in pairs will be assigned words to add meanings and sentences (either hand written and added by teacher to Google Doc, or directly onto the Google Doc by students on netbooks.

After this is done, proceed through a regular sequence of word study activities to include – Word Walk, Open Sorts recorded with a buddy, meaningful sentences/story, word hunts.

An extension for some could be to record their sentences/stories as an audio file and uploaded to a wiki page in the team wiki created to hold them.

**Formative Assessment**:

1. Knowledge Rating Activity - Give the students the Knowledge Rating Activity sheet again that they used in the beginning of the unit. How much more do they know now? They can change their rating by marking with a different color pen. They may also change/add meanings with a different color pen.

2. Crossword puzzle/Word Search – Worksheets to assess understanding of vocabulary terms.

How will you **Differentiate Instruction** for various learners?

**Process** – partner work (sorting, word hunts), reading/scribing support for some on formative assessment

**Student-centered learning**:

Collaboration

**Inquiry-based learning**: Structured inquiry

**Materials**:

* Ecosystems vocabulary word sort
* Word study notebooks
* Pre-assessment sheets from each student
* Crossword Puzzle and answer key
* Word Search and answer key

**Resources:**

* ReadWriteThink website to create crossword puzzle-http://www.readwritethink.org/files/resources/interactives/crossword/
* Discovery Education Puzzlemaker website to create hidden message/word search puzzle - http://puzzlemaker.discoveryeducation.com/code/BuildHiddenMessageWordSearch.asp

**Vermont Standards & Grade Expectations Addressed**:

**R6: 5 Identifies the meaning of unfamiliar words by…**

• Using strategies to unlock meaning (e.g., knowledge of word structure, including prefixes/suffixes and base words; or context clues; or other resources, such as dictionaries, glossaries, thesauruses; or prior knowledge) R–6–2.1

**21st Century Skills including Technology**:

* Critical Thinking (analyzing own understanding in formative assessment reflection piece)
* Collaboration

**File Attachments**:

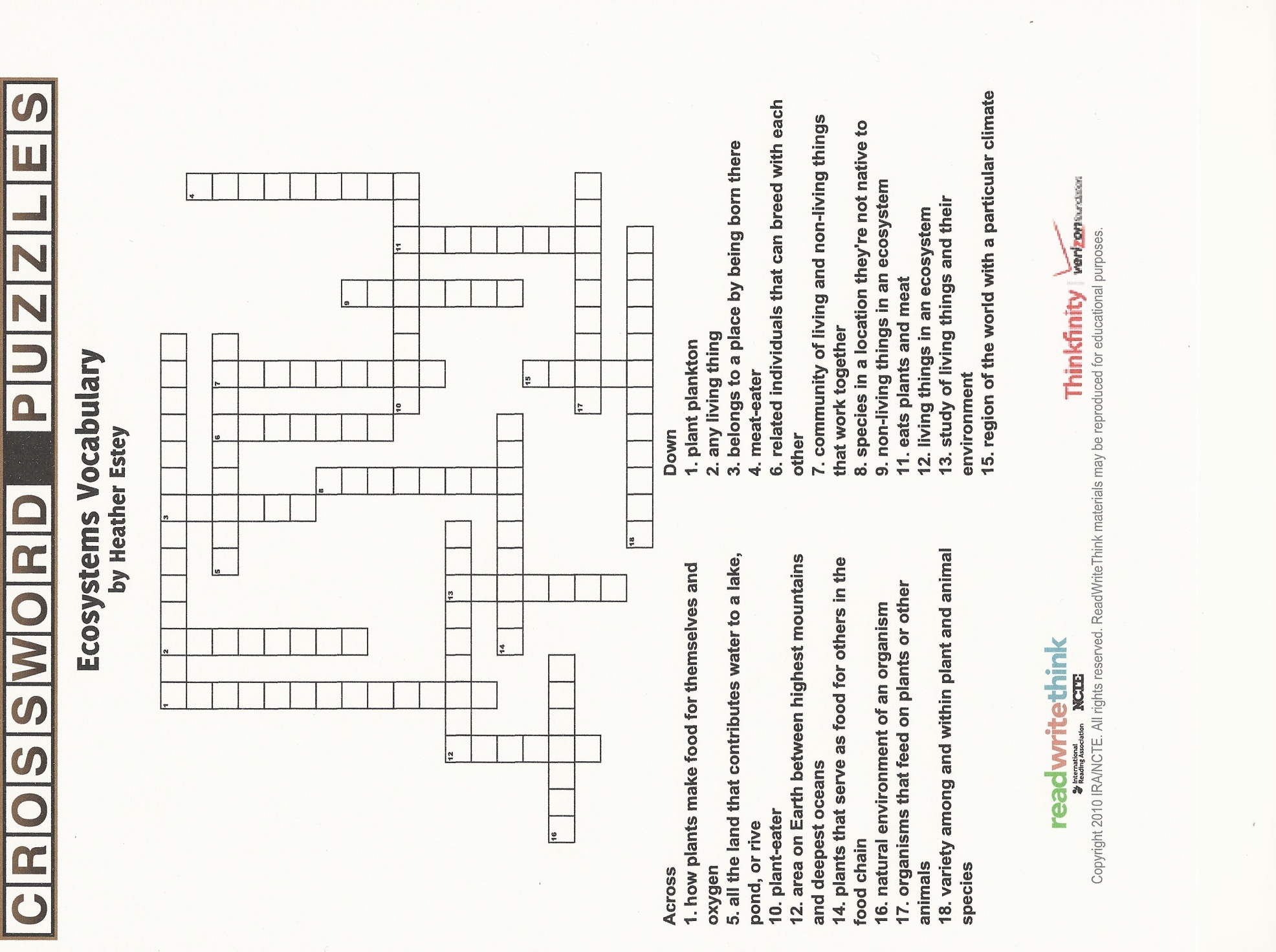
Ecosystems vocabulary word sort

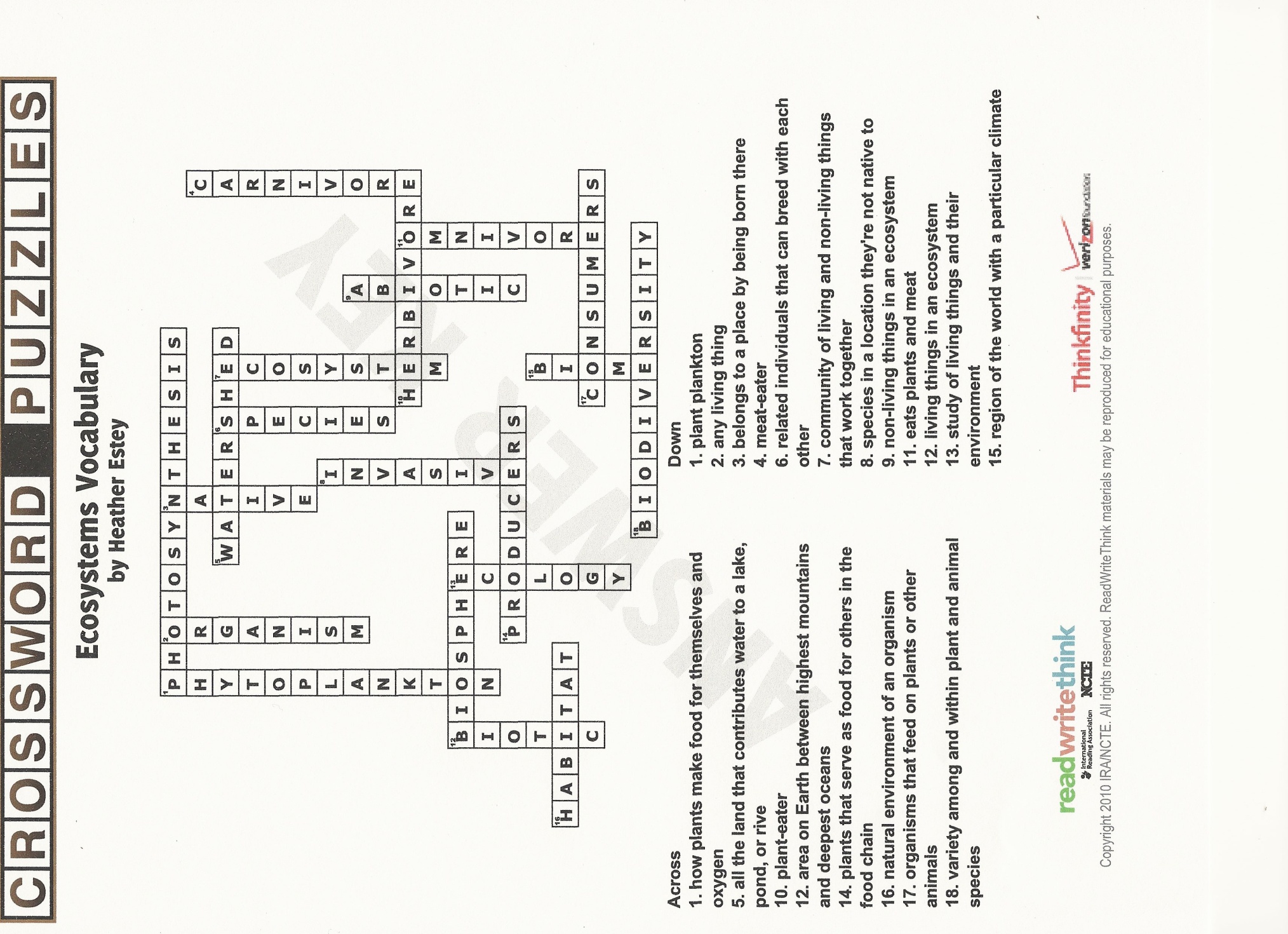
The LCB: Our Home word search and solution

Ecosystems Vocabulary crossword and answer key

|  |  |  |  |
| --- | --- | --- | --- |
| Consumers | Producers | Photosynthesis | Organism |
| Species | Invasive | Zooplankton | Phytoplankton |
| Ecology | Environment | Biodiversity | Community |
| Equilibrium | Watershed | Habitat | Biotic |
| Abiotic | Biome | Biosphere | Herbivore |
| Carnivore | Omnivore | Decomposers | Native |

Sort Name: Ecosystems vocabulary





**Name:**

**Class:**

**THE LCB: OUR HOME**

****

M U I R B I L I U Q E Y N P W

T E Y G O L O C E R T O H H A

O R E L A K E C O I T O T S T

R O C H A M O V S K T N Z R E

G V P L A S I R N O E O E E R

A I I N Y N E A S M O S R S S

N B B S R V L Y N P C R E O H

I R T A I P N O L R O E H P E

S E C D O T R A A O M M P M D

M H O T H I N N S D M U S O I

S I Y E V K N A S U U S O C E

B H S N T C O T S C N N I E Y

P I E O S T E I M E I O B D I

S I N V A S I V E R T C S O U

O M N I V O R E R S Y H O M E

BIODIVERSITY BIOSPHERE CARNIVORE COMMUNITY

CONSUMERS DECOMPOSERS ECOLOGY ECOSYSTEM

ENVIRONMENT EQUILIBRIUM HERBIVORE INVASIVE

NATIVE OMNIVORE ORGANISMS PHOTOSYNTHESIS

PHYTOPLANKTON PRODUCERS WATERSHED ZOOPLANKTON

\_\_ \_\_ \_\_ \_\_ \_\_ \_\_ \_\_ \_\_ \_\_ \_\_ \_\_ \_\_ \_\_ \_\_ \_\_ \_\_ \_\_ \_\_ \_\_ \_\_ \_\_ ' \_\_

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**THE LCB: OUR HOME Solution**

M U I R B I L I U Q E Y N P W

T E Y G O L O C E R T O H H A

O R E L A K E C O I T O T S T

R O C H A M O V S K T N Z R E

G V P L A S I R N O E O E E R

A I I N Y N E A S M O S R S S

N B B S R V L Y N P C R E O H

I R T A I P N O L R O E H P E

S E C D O T R A A O M M P M D

M H O T H I N N S D M U S O I

S I Y E V K N A S U U S O C E

B H S N T C O T S C N N I E Y

P I E O S T E I M E I O B D I

S I N V A S I V E R T C S O U

O M N I V O R E R S Y H O M E

(Over,Down,Direction)

BIODIVERSITY(1,12,NE)

BIOSPHERE(13,13,N)

CARNIVORE(3,9,NE)

COMMUNITY(11,7,S)

CONSUMERS(12,14,N)

DECOMPOSERS(14,13,N)

ECOLOGY(9,2,W)

ECOSYSTEM(9,2,SW)

ENVIRONMENT(3,13,NE)

EQUILIBRIUM(11,1,W)

HERBIVORE(2,10,N)

INVASIVE(2,14,E)

NATIVE(8,10,S)

OMNIVORE(1,15,E)

ORGANISMS(1,3,S)

PHOTOSYNTHESIS(14,1,SW)

PHYTOPLANKTON(1,13,NE)

PRODUCERS(10,7,S)

WATERSHED(15,1,S)

ZOOPLANKTON(13,4,SW)

The Lake Champlain Basin's ecosystem is our home.

**Lesson Title**: Word Study - Ecosystems Pictionary

**Name of Corresponding Unit**: We’re All in This Together

**Creator**: Heather Estey

**Grade level(s**): 5/6

**Recommended Duration**: 50 minutes, 2 sessions

**Essential Question**: What vocabulary words do scientists use to share ideas and learn about ecosystems?

**Specific Learning Goals for this lesson**:

* Students will **know**:
  + The meanings of ecosystems vocabulary words
* Students will **understand:**
  + Scientists use particular terms to describe ecosystems concepts.
* Students will **be able to:**
  + Create a visual dictionary glog showing the meaning of their vocabulary words

**Lesson Overview**: In this lesson students will create pages for a class pictionary to be created in a digital format and linked to our class website. Each page will be created in the students’ Glogster.edu account. These pages will be grouped into a class pictionary that will be linked to our class website and team wiki. The students in the other classes will use this pictionary as a vocabulary resource. A hard copy will also be printed and saved for use in the classroom.

**Description & Sequence**:

* Directions: We’ll be creating a visual dictionary of all our ecosystems vocabulary words. Each word will have its own page with images and meaning on it. You’ll have the choice to work independently or with a partner to create pages. These pages will be created as glogs in your Glogster account. Then they’ll be shared and put into a class file which we’ll upload to our class website and wiki. We’ll also print a hard copy.
* Students will choose words from the vocabulary list to work on. I’ll make sure that we don’t duplicate words. Students who want the same word may work together on a page. Each student (or pair) will get logged on to a netbook and a Glogster account. I’ll model the process with a sample Glog I’ve created. Each Glog needs to contain:
  + Word
  + Meaning
  + Images that show the meaning
  + Anything else you want to add! Creativity counts.
* I’ll go over some guidelines about design (choice of background that conveys a serious tone, making the word stand out visually, limit visual distractions like moving images, etc.)
* Students may create other pages as time allows to add to the pictionary. This will be an ongoing project that can be added to when students have choice time for working on projects. The class will be encouraged to create a complete pictionary containing all the ecosystems vocabulary words.

**Pre-Assessment**: Ecosystems Vocabulary Sort formative assessment done in the prior lesson.

How will you **Differentiate Instruction** for various learners?

* **Process** – tech buddies, partner with like-interests, choice in levels of complexity to add to glog (text, graphics from program, images uploaded from internet, video, audio, etc.)
* **Product** – choice in elements to add to glog (images, video, audio, etc.)

**Student-centered learning**:

* Choice
* Collaboration
* Authentic audience (classmates studying the same topic)
* Shared responsibility

**Inquiry-based learning**:

Guided inquiry

**Materials**:

Completed Ecosystems vocabulary list from vocabulary notebooks

Netbooks

**Resources**:

<http://edu.glogster.com/>

**Vermont Standards & Grade Expectations Addressed**:

**R6: 5 Identifies the meaning of unfamiliar words by…**

• Using strategies to unlock meaning (e.g., knowledge of word structure, including prefixes/suffixes and base words; or context clues; or other resources, such as dictionaries, glossaries, thesauruses; or prior knowledge) R–6–2.1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **GE: Technology (2010)** | | | | |
|  | **Creativity & Innovation** | | | |
|  |  | Grades 3-5 | | |
|  |  |  | **Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.** | |
|  |  |  |  |  |
|  |  |  | **Performance Indicator - B. create original works as a means of personal or group expression.** | |
|  |  |  |  | * Students utilize a variety of digital tools to create original works for use in an individual or group product. |

**21st Century Skills including Technology**:

* Digital dictionary created using Glogster.edu, uploaded to class website and wiki
* Creativity
* Collaboration

**Lesson Title**: Ecosystems Vocabulary Morning Meeting Activities

**Name of Corresponding Unit**: We’re All in This Together

**Creator**: Heather Estey

**Grade level(s**): 5/6

**Recommended Duration**: 5-10 minutes

**Essential Question**: How do scientists use language to communicate important ideas?

**Specific Learning Goals for this lesson**:

* Students will **know**: the meanings and spellings of the ecosystems vocabulary words
* Students will **understand**: Scientists use specific vocabulary to share ideas, learn, and communicate their message to others.
* Students will **be able to**:
  + share the meanings of ecosystems vocabulary terms
  + spell correctly ecosystems vocabulary terms

**Lesson Overview**: This lesson includes a variety of games that may be played during Morning Meeting or other free times during the day to review vocabulary.

**Description & Sequence**:

These games may all be played as group games/activities as time allows during daily Morning Meetings, for energizers/body breaks during the day, free time, etc. Each one should take no more than 5-10 minutes to play.

* **Charades** – Leader prepares a list of vocabulary words. One student or a group of students acts out vocabulary words while the rest of the class tries to guess which word is being acted out.
* **Big Words** – Leader (teacher usually) selects a vocabulary word, scrambles its letters and writes it on the board or chart paper. The letters are written in order from the original word with all vowels first, then all consonants in alphabetical order. Students on scrap paper write words that can be made from these letters, trying to make the words as big as possible, and trying to discover the big word. The group shares out what words they discovered and records these on the chart.
  + In other variations of this game – group records all words directly on the chart (rather than individuals creating lists first). This activity is based on spelling activities from the book Making Big Words by Patricia Cunningham and Dorothy Hall.
* **Match-Up** – Leader passes out pairs of vocabulary cards – a word on one card and its definition on another – to players. Each player receives one card, either a word or a definition. Leader signals students to find the match for their card by sharing card information. Once each pair has been matched. Players stand in a circle next to their partners. Leader invites each pair to share what word and definition they have on their cards.
  + In a variation of this game, students may match up affixes/roots with base words to create new words.
* **Off My Back** – The person who is it stands up front facing the class. The leader puts a sticky on his/her back showing an ecosystems vocabulary word. It may ask the group “yes-no” questions about that word. Class may define rules for the types of questions that may be asked, and decide on number of clues It may have before making a guess.
* **Sparkle** – This is a spelling game. Group stands in a circle. It chooses a vocabulary word for the group to spell. It states the word. Next person uses the word in a sentence that shows its meaning. Next person begins spelling the word with its first letter. Spelling continues letter by letter around the circle. If a spelling error is made, teacher or the following person in the circle may challenge the letter. Speller may “phone a friend” for help. Once spelling the word is complete, the last person repeats the word. The next person “sparkles on down” (“sparkle” hands in the air while sitting down) and is now out of the game. Next person begins a new word.
* **Connections** – On slips of paper, leader writes down ecosystems vocabulary words (nouns work best). Each player is given a word and then tries to make connections with other players’ words. When a connection is made, the players stand next to each other. Players later share out the connections they’ve made.
* **Twenty Questions** – The group sits in a circle. One person is chosen to stand in the middle of the circle with a sticky on his/her back. On the sticky is a vocabulary word. This person can ask up to twenty yes-or-no questions to try to figure out what word is written on the sticky. Each time a question is asked, the class responds with thumbs up or down to indicate yes or no. The group can agree ahead of time what types of questions are not allowed. It can make a guess at any time with a maximum of three guesses. After twenty questions, the child can ask for clues from the class before making a final guess.
* **Silent Spelling** – Display the list of ecosystems vocabulary words. Each student is given a letter card that. The leader calls out one of the vocabulary words. The students who have a letter card that can be used in that word stand up and the group works together silently to form a line with the letters in the correct order.

How will you **Differentiate Instruction** for various learners?

* **Content:** Learning buddies to help with vocabulary understanding, spelling
* **Process:** Variety of learning styles addressed in games
* **Product:** Variety of products produced in games

**Student-centered learning**:

* **Collaboration**
* **Shared responsibility**

**Inquiry-based learning**: Structured inquiry

**Materials**:

* Ecosystems Vocabulary list

**Resources**:

Origins online teacher resources - <http://www.originsonline.org/rc_classroom.php>

Cunningham, Patricia and Hall, Dorothy, Making Big Words.

**Vermont Standards & Grade Expectations Addressed**:

**R6: 5 Identifies the meaning of unfamiliar words by…**

• Using strategies to unlock meaning (e.g., knowledge of word structure, including prefixes/suffixes and base  words; or context clues; or other resources, such as dictionaries, glossaries, thesauruses; or prior knowledge) R–6–2.1

**R6: 6 Shows breadth of vocabulary knowledge through demonstrating understanding of word meanings or relationships by…**  
• Selecting appropriate words or explaining the use of words in context, including content-specific vocabulary,   words with multiple meanings, or precise vocabulary  R–6–3.2

**21st Century Skills including Technology**:

* **Creativity/Innovation**
* **Communication/Collaboration**
* **Critical Thinking/Problem-Solving**