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|  |
| --- |
| Science Cluster  Grade 7: Interactions Within Ecosystems  2/29/2012  Anna Hueging  110484 |



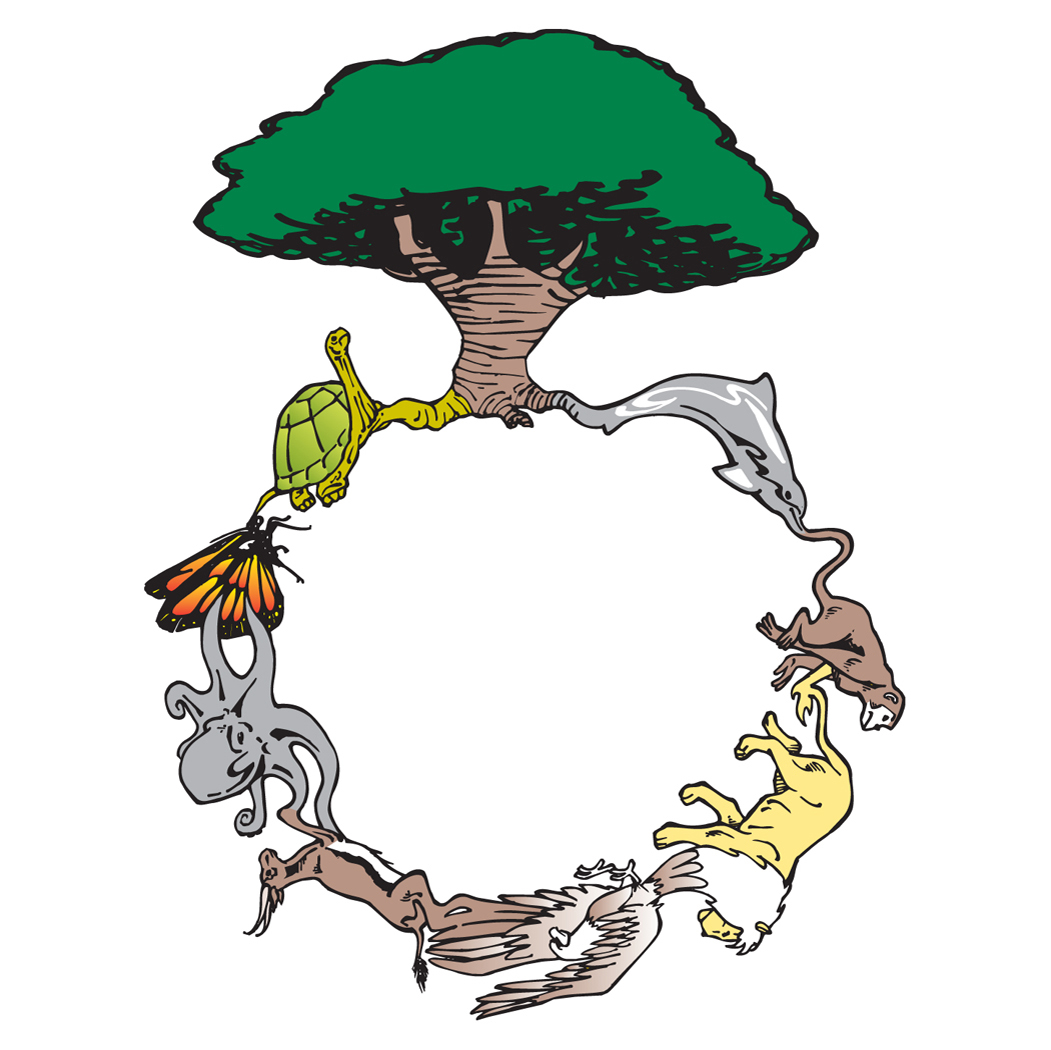


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# Conceptual Outline:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Activities | Assessment | Supplies |
| **In All themes** |  |  |  |
| Use appropriate vocabulary related to their investigations of interactions within ecosystems | -Journal to enter new words in  [vocabulary](#vocabulary)  -cross word puzzles  <http://www.puzzle-maker.com/CW/>  -label diagrams  [http://www.vector-finder.com](http://www.vector-finder.com/) | Formative: using vocabulary in class, crossword.  Summative: Labels and discussion in Final Project | Scissors  Glue  Computer  Journal |
| **Theme 1** | **What is an ecosystem and what would a ideal ecosystem look like?** |  |  |
| Define ecosystem and describe various examples that range from the microscopic to the entire biosphere | -pick an ecosystem and draw it <http://library.thinkquest.org/11353/ecosystems.htm>  [http://www.windows2universe.org](http://www.windows2universe.org/)  [http://www.windows2universe.org](http://www.windows2universe.org/)  -mind map  <http://www.thinkbuzan.com/>  -BBC planet earth- pole to pole | Formative: Planet earth video Questionnaire and drawing  Summative: Final Project | -Poster paper  -markers  -TV  -computer |
| Identify abiotic and biotic components of ecosystems that allow particular organisms to survive | -label diagram  -label classroom- abiotic and biotic  -[worksheets](#abitic)  -flashcards of abiotic/biotic things to show class  <http://www.studyblue.com/>  -Venn diagram activity <http://www.uen.org/Lessonplan/preview.cgi?LPid=1997> | Formative: Venn Diagram  Summative: Final project labels | -labels  -Sticky tac  -worksheets  -flaskcard (cue cards)  -Ven diagram |
| Describe ecological succession and identify signs of succession in a variety of ecosystems | -what comes first activity with cards and ordering them correctly.  [Pond succession](http://violingeek12.com/sorules/SO%20rules/SOStuff/Ecology/Examining%20Stages%20in%20Ecological%20Succession.htm)  <http://sciencebitz.com/?page_id=41>  -how forest fire start succession in predictable way  <http://mff.dsisd.net/Environment/Succession.htm>  [forest fire succession](http://kids.britannica.com/comptons/art-90130/Secondary-succession-takes-place-following-a-major-disturbance-such-as)  -where their ecosystem came from  -BBC Life- Plants | Formative: What comes first Activity  Summative: Final Project labels | -what comes first cards  -TV |
| **Theme 2** | **How do food webs work and what is the most important stage?** |  |  |
| Analyze food webs using ecological pyramids to show energy gained or lost at various consumer levels | -make a food chain with Disney character  <http://disney.go.com/characters/>  -iMindmap to make a food web as a class as a class  <http://www.thinkbuzan.com/>  -explain their ecosystem  -Create a food web for a meal  -Predator prey game  [game](http://dragon.sleepdeprived.ca/games/wide_games/wide_games_15.htm) | Formative: My meal food web  Summative: Final project | -Disney character cut outs  -Computer with iMindMap  -placemats saying water, food  -flags |
| Analyze, using ecological pyramids, he implications of the loss of producers and consumers to the transfer of energy within an ecosystem | -Food Fight game  <http://www.brainpop.com/games/foodfight/>  -design your own predator\*  [Design process](http://www.nasa.gov/audience/foreducators/plantgrowth/reference/Eng_Design_5-12.html)  - graph lynx hair population and discuss why <http://www.biotopics.co.uk/newgcse/predatorprey.html> | Formative: lynx hair activity  Summative: design your own predator, final project | -computer  -paper  -Markers  -graph paper |
| Explain using ecological pyramids the potential for bioaccumulation within an ecosystem | -[bioaccumulation activity](#Bioaccumlation)  [information](http://science.jrank.org/pages/854/Bioaccumulation.html)  [more information](http://www.learner.org/jnorth/tm/DDT.html)  -Mercury in fish webquest  [webquest](freemann.ism-online.org/files/2011/11/Ecosystem-and-Food-Web-Quest-2011.pdf)  -potentials in your ecosystem? | Formative: web quest  Summative: Final project, their bioaccumulation | -water  -cups  -Spray bottle  -computer |
| **Theme 3** | **How do photosynthesis and cellular respiration work and what would happen if neither existed in our world?** |  |  |
| Compare photosynthesis to cellular respiration and explain how both are part of the cycling of matter and the transfer of energy in ecosystems | -[Information](http://www.worsleyschool.net/science/files/photosynthesis/page.html)  -[more information](http://www.nclark.net/PhotoRespiration)  -Design and conduct an experiment with the class on whether plants need light to live  -Explain in your way activity (draw, act out, presentation, etc.) | Formative: Explain in your own way  Summative: Final project and plant experiment | -plant  -closet  -paper for observation |
| **Theme 4** | **How are micro-organisms used and do you feel they impact you more negatively or positively?** |  |  |
| Demonstrate proper use and care of the microscope to observe micro-organisms | -make a pictorial how to manual of looking at a slide  [Microscopes information](http://sciencespot.net/Pages/classbio.html#micro)  -teach a grade 5 how to use a microscope | Formative: how to manual  Summative- teach grade 5 | -booklet to make manual in  -microscope  -slides  -grade student |
| Identify beneficial and harmful roles played by micro-organisms | -[Make a band activity](#band)  [Microbes good and bad](http://www.microbiologyonline.org.uk/students/microbe-passports-1#/home)  -research microbes in your ecosystem  [Microbes in ecosystem](http://library.thinkquest.org/CR0212089/micr.htm) | Formative: make a band  Summative: Final Project | -paper  -computer  -markers |
| Research and describe human food production or preservation techniques that apply a knowledge of micro-organisms | -make yogurt or bread in class  <http://www.makeyourownyogurt.com/>  [making bread experiment](http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks3/science/bread/buble1-activity.htm)  [bread recipe](http://allrecipes.com/recipe/best-bread-machine-bread/)  -jigsaw method to teach food preservation methods  [Overview of methods](http://library.thinkquest.org/J0113061/preservation.htm)  [More in depth on the methods](http://textbookofbacteriology.net/control_3.html)  -Public service Announcement about how to protect your food from micro-organisms | Formative: jigsaw  Summative: Public service announcement | -milk  -yogurt  -bread machine  -flour  -yeast  -egg  -sugar  -video camera |
| **Theme 5** | **How have humans impacted ecosystems and does/should that change in the future?** |  |  |
| Identify and describe positive and negative examples of human interventions that have an impact on ecological succession or the makeup of ecosystems | -pros and cons list of a certain human intervention  [Parks Canada](http://www.pc.gc.ca/apprendre-learn/prof/sub/theme/restoration_e.asp)  -research if anything being done in your ecosystem or could be done | Formative: compare and contrast  Summative: final project | -paper |
| Identify environmental, social, and economic factors that should be considered in the management and preservation of ecosystems | -mind map of what they already know that is being done to help  -bring an issue to the table and why it is being done  [Some issues to explore](http://www.ec.gc.ca/education/default.asp?lang=en&n=3AD65317-1)  -debate whether humans do good or bad for the environment | Formative: bring an issue to t and he table  Summative: debate | -computer  -stand for debate |
| Propose a course of action to protect the habitat of a particular organism within an ecosystem | - Research and write an organization to thank them.  <http://wwf.ca/>  <http://www.pc.gc.ca/>  <http://www.pc.gc.ca/>  -what could you do in your ecosystem to make it better? | Formative: Thank you letter  Summative: Final Project | -envelope  -letter  -Computer |

# Cluster 0

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Category | Outcome | Cluster 1 Themes | | | | |
| Theme 1 | Theme 2 | Theme 3 | Theme 4 | Theme 5 |
| Initiating | 5-0-1 A |  |  | X |  |  |
| 5-0-1 B |  |  | X |  |  |
| 5-0-1 C |  |  |  |  | X |
| 5-0-1 D |  | X |  |  |  |
| Researching | 5-0-2 A |  |  | X | X | X |
| 5-0-2 B |  | X |  | X |  |
| 5-0-2C |  | X | X | X |  |
| Planning | 5-0-3 A |  |  | X |  |  |
| 5-0-3 B |  |  | X |  |  |
| 5-0-3 C |  |  | X |  |  |
| 5-0-3 D |  | X |  |  |  |
| 5-0-3 E |  | X |  | X | X |
| Implementing a Plan | 5-0-4 A |  |  | X |  |  |
| 5-0-4 B |  | X |  | X |  |
| 5-0-4 C |  | X | X |  | X |
| 5-0-4 D |  | X | X |  | X |
| 5-0-4 E |  |  |  | X |  |
| Observing, Measuring, Recording | 5-0-5 A |  |  | x |  |  |
| 5-0-5 B |  | X |  |  |  |
| 5-0-5 C |  |  |  | X |  |
| 5-0-5 D |  |  |  |  | X |
| 5-0-5 E |  |  |  |  |  |
| 5-0-5 F |  |  | X |  | X |
| Analyzing and Interpreting | 5-0-6 A |  |  | X |  |  |
| 5-0-6 B |  |  | X |  |  |
| 5-0-6 C |  |  |  |  |  |
| 5-0-6 D |  | X |  | X |  |
| 5-0-6 E |  | X |  |  |  |
| 5-0-6 F |  |  | X | X |  |
| Concluding and Applying | 5-0-7 A |  |  | X |  |  |
| 5-0-7 B |  |  | X |  |  |
| 5-0-7 C |  |  | X |  |  |
| 5-0-7 D |  | X |  | X | X |
| 5-0-7 E |  | X |  |  | X |
| 5-0-7 F |  |  | X |  |  |
| 5-0-7 G |  | X | X | X | X |
| 5-0-7 H |  | X | X | X |  |
| Reflecting on Science and Technology | 5-0-8 A |  |  | X |  |  |
| 5-0-8 B |  |  | X |  |  |
| 5-0-8 C |  |  |  | X | X |
| 5-0-8 D |  |  |  | X |  |
| 5-0-8 E |  |  |  | X | X |
| 5-0-8 F |  |  |  |  | X |
| 5-0-8 G |  |  | X |  | X |
| Demonstrating Scientific and Technological Attitudes | 5-0-9 A |  |  |  |  | X |
| 5-0-9 B |  |  |  |  | X |
| 5-0-9 C |  | X | X | X |  |
| 5-0-9 D |  | x |  | X |  |
| 5-0-9 E |  |  |  |  | X |
| 5-0-9 F |  |  |  |  | X |

# Integration of other curriculums

## Social Studies

When discussing ecosystems it would be a great time to address these issues in social studies. You could point them out on a map after watching the BBC video the different places. This will definitely get the students to appreciate the diversity of the global environment

1. KL-017 Locate on a world map and describe the major climatic and vegetation zones.
2. VL-008 Appreciate the diversity of the global natural environment.

There is a large amount of outcomes in the social studies curriculum that can and should be discussed when discussing human impacts on the environment. When doing the debate and researching on what organizations and governments are doing to help protect the environment also examine these issues from a social studies stand point. This is a great time to cross curriculums and teach social responsibilities that we as humans have for our earth.

A list of some of the outcomes from the Social studies, grade 7, curriculum are listed below:

1. KL-029 Give examples of the impact of human activity on the natural environment in a society of Europe or the Americas.
2. KE-053 Describe sustainable development issues in a society of Europe or the Americas.
3. VL-009 Be willing to take actions to help sustain the natural environment in Canada and the world.
4. KE-051 Identify common challenges faced by large urban centres.
5. KL-026 Identify human activities that contribute to climate change.
6. KL-027 Describe social, environmental, and economic consequences of climate change.
7. KP-044 Identify ways in which government decisions may affect human impact on the natural environment.
8. KE-052 Identify issues related to food production and distribution in a society of Europe or the Americas.
9. KE-054 Give examples of the environmental and social impact of consumerism in the local community and in a society of Europe or the Americas.
10. VE-017 Be willing to consider the consequences of their consumer choices.
11. KG-035 Give examples of global cooperation to solve conflicts or disasters.
12. KG-036 Identify various international organizations and describe their role in protecting or enhancing global quality of life.

## English

There is a lot of writing and expression being done in this unit so there is a lot of chance to integrate English into the unit. Below are a few examples of outcomes from the grade 7 English curriculum that can be addressed in this unit.

1. 4.4.3 Attentive listening and viewing
2. 4.2.3 Cooperate with others
3. 5.2.2 Work in groups
4. 3.3.4 Develop new understanding

## Math

For math the outcomes to integrate are limited but there are a few. You may find other ways to integrate math into the unit but these will likely be by the use of multiplication, addition, subtraction and division. My best guess at where you would use this is when you are teaching how energy transfers through an ecosystem. Other outcomes you may cover are the following during your experiment on plants.

1. 7.PR.1. Demonstrate an understanding of oral and written patterns and their corresponding relations.
2. 7.PR.2. Construct a table of values from a relation, graph the table of values, and analyze the graph to draw conclusions and solve problems

# Final Project/Summative assessment

For the final project the students can work with 1 or 3 other students. They will be required to research on an ecosystem of their choice and be able to provide/answer the following:

1. Provide a labeled diagram using the vocabulary words
2. Label abiotic and biotic parts of their ecosystem
3. Using ecological succession explain where their ecosystem has come from and/or where it is going
4. Show food webs and explain the transfer of energy in their ecosystem
5. Label consumers, producers, decomposers etc in their ecosystem
6. Make the ideal predator and explain why it is that in their ecosystem
7. Explain if there is any bioaccumulation in their ecosystem and how it occurs
8. Show how photosynthesis and cellular reproduction occur in your ecosystem
9. What microbes exist in their ecosystem and there pros and cons?
10. What human interactions are there in their ecosystem, both good and bad?
11. What could they do to help your ecosystem?

These will be issues/questions that they will discover the answers to slowly as we cover the unit. At the end of the unit their group will present their information as a power point, poster board, movie, or anyway they want as long as they can show their understanding of the certain topics/outcomes.

They will also be required to fill out a portfolio so that both they and I can see if they have mastered an outcome. To fill in the portfolio they will provide an artifact, which will most likely be a part of the final project but they can pick other activities to prove their knowledge as well, and then fill out the following form:

|  |
| --- |
| **Topic:** |
| Color in where you feel you are in the understanding of this topic: |
| I do not feel I understand the material at all |
| I feel I am starting to understand the material but need more help as there are some parts of the topic I do not understand yet |
| I feel I understand the material but am not yet confident enough with the knowledge to explain it to others without any mistakes |
| I am very confident in the material and feel that I could explain it to others easily and not make any mistakes |
| Draw or write something that you feel demonstrates what the topic is about |

If you, as the teacher, agree with where the student stands on understanding the topic then you transfer the grade to the grade book but if you do not then this gives you an opportunity to meet with the student and come to a grade you can both agree on is a fair representation of their understanding of an outcome.

The grade book I completed on excel, please see the attachment to look it over. Basically students will be given a 1-4 for each topic following the written scale in the forms above. 1 represents not understand, 2 starting to understand, 3 means they understand with errors, 4 is understanding with no errors. This is then average throughout either, all the Knowledge, Scientific inquiry, or Design process marks and given a 1-4 overall scale. This can then be put into a report card easily.

# Assessment Summary

|  |  |  |  |
| --- | --- | --- | --- |
|  | Scientific Inquiry | Design Process | Knowledge & Understanding |
| Formative | - My meal food web  - list the pros and cons of a human intervention  - bring an issue to the table  - make a band for microorganism exploration  - lynx-hare activity  - Mercury in fish webquest | - mind map and ecosystem drawing  - how to manual for looking at a slide on a microscope  - make a band for microorganism exploration | -Planet earth video Question Sheet  - Create a Venn Diagram comparing abiotic and biotic factors in an ecosystem  - What comes first Activity  - Explain in your way (draw, act out, presentation, etc.) how photosynthesis and cellular respiration work.  - Thank you letter  - jigsaw  - lynx-hare activity  - What comprises an ecosystem  - How food pyramids work  - Interactions within ecosystems  - Difference between biotic and abiotic  - Differences and similarities of photosynthesis and cellular respiration  - Purposes and effects of microorganisms  - Human impact in ecosystems |
| Summative | - plant experiment  - bioaccumulation in their ecosystem  -debate whether humans do good or bad for the environment  - Public service announcement  - Final Project | -debate whether humans do good or bad for the environment  - teach a grade 5 student how to use a microscope  - design your ecosystems ideal organism/predator  - Public service announcement  - Final Project | - plant experiment  - bioaccumulation in their ecosystem  - Public service announcement  - Final Project |

# Other Resources:

1. Ecosystem overview: <http://www.blogger-index.com/2108336-the-living-environment-cheat-sheet>
2. Curriculum document: <http://www.edu.gov.mb.ca/k12/cur/science/found/5to8/7c1.pdf>
3. Great activities: <http://www.projectwild.org/documents/projectWILD.pdf>
4. Books:
   1. [The War in Your Backyard: Life in an Ecosystem)](http://www.amazon.com/War-Your-Backyard-Ecosystem-Raintree/dp/1410919706/ref=sr_1_1?s=books&ie=UTF8&qid=1330363660&sr=1-1) by [Louise Spilsbury](http://www.amazon.com/Louise-Spilsbury/e/B001HPLM4A/ref=sr_ntt_srch_lnk_1?qid=1330363660&sr=1-1)
   2. [Life in a Grassland (Ecosystems in Action)](http://www.amazon.com/Grassland-Ecosystems-Action-Dorothy-Hinshaw/dp/0822521393/ref=sr_1_2?s=books&ie=UTF8&qid=1330363660&sr=1-2) by [Dorothy Hinshaw Patent](http://www.amazon.com/Dorothy-Hinshaw-Patent/e/B000APW81O/ref=sr_ntt_srch_lnk_2?qid=1330363660&sr=1-2) and [William Munoz](http://www.amazon.com/William-Munoz/e/B000AQ0S8S/ref=sr_ntt_srch_lnk_2?qid=1330363660&sr=1-2)
   3. [Ecology (Sci-Hi: Life Science)](http://www.amazon.com/Ecology-Sci-Hi-Science-Donna-Latham/dp/1410933369/ref=sr_1_7?s=books&ie=UTF8&qid=1330363660&sr=1-7) by [Donna Latham](http://www.amazon.com/Donna-Latham/e/B001JP4G1Y/ref=sr_ntt_srch_lnk_7?qid=1330363660&sr=1-7)

# Appendix:

Vocabulary: (you may add more but these are the required ones. Students may represent with pictures as well)

Ecosystem: a place on earth where living things interact with other living things as well as non-living things.

Biosphere: The part of the earth and its atmosphere in which living organisms exist or that is capable of supporting life

Abiotic: refers to a factor in the environment that is not alive, such as rocks, elements, weather, and water

Biotic: of or relating to living organisms

Organisms:  a living thing that has (or can develop) the ability to act or function independently

Ecological succession: the gradual and orderly process of change I an ecosystem brought abot be the progressive replacement of one community by another until a stable climax is established.

Photosynthesis: A biochemical process by which light energy, carbon dioxide, and water are converted in plant to oxygen and sugar.

Cellular respiration: A biochemical process by which sugar and oxygen are converted in animals to carbon dioxide, energy and water

Ecological pyramid:  a graphical representation designed to show the energy transfer at each energy level in a given ecosystem

Bioaccumulation: the buildup of substances, such as pesticides, or other organic chemicals in an organism.

Scavengers: eat both plants and animals that are dead and decaying.

Decomposers: organisms that break down dead organisms.

Microorganisms: organisms that are extremely small and you need a microscope to see them

## Make a band Activity:

Split the groups into 4 or 5 equal groups, get them to research their micro-organism than create the following so that they can explain micro-organisms role in an ecosystem:

* Name
* CD cover
* Song
* Review

## Bioaccumulation Activity

In this activity we are going to simulate a farmer spraying pesticide on field and how this accumulates up the food chain. Like DDT and how it affected hawks.

Materials

-water (represent pesticide)

-Spray bottle

-cups

Procedure

1. Separate students into( for a class of 20) 12 mosquitoes, 6 songbirds, 1 hawks, and one sprayer
2. Note to the students that the sprayer is going to spray some water into the mosquito’s cup to act like a pesticide.
3. The spray should put about 10 ml in the cup and this kills the mosquitoes
4. The song birds then eat the dead mosquitos. (Easy meal for them)
5. When they “eat” the mosquitos the song birds get the pesticide too, so the water is transferred from the mosquito’s cups to the song bird’s cup.
6. Now the song birds do not die but the hawk still catches them for a meal. So collects all the “pesticide” as well and get the water. You note to the students that the hawks cup is very full now and that large amount of pesticides will not kill the hawk but will cause the eggs to have thin shells
7. What do you think will happen to the hawk population?
8. Talk about the DDT story with the students.

## Safety Lesson

The plan is to teach microscope safety by getting the students to make a How to guide and teach a grade 5 student proper use of a microscope

## Abiotic vs. Biotic Worksheet

**Directions:** Complete the following Frayer diagrams in your science notebooks.

Definition Use the word in a sentence.

Give Examples Write a test question.

Definition Use the word in a sentence.

Give Examples Write a test question.

**Directions:** The following list of words needs that need to be placed into the category “biotic” or “abiotic” Place an “A” on the line if the word describes an abiotic factor and a “B” on the line if the word describes a biotic factor.

\_\_\_\_\_\_\_ Whale

\_\_\_\_\_\_\_ Clock

\_\_\_\_\_\_\_ Water

\_\_\_\_\_\_\_ Fish

\_\_\_\_\_\_\_ Paper

\_\_\_\_\_\_\_ Glass

\_\_\_\_\_\_\_ Aluminum

\_\_\_\_\_\_\_ Wooden Ruler

\_\_\_\_\_\_\_ Sand

\_\_\_\_\_\_\_ Clouds

\_\_\_\_\_\_\_ Corpse

\_\_\_\_\_\_\_ Snail

\_\_\_\_\_\_\_ Salad

\_\_\_\_\_\_\_ Bread

\_\_\_\_\_\_\_ Plant

\_\_\_\_\_\_\_ Hair

\_\_\_\_\_\_\_ Finger Nails

\_\_\_\_\_\_\_ Pipe

\_\_\_\_\_\_\_ Cotton Fabric

\_\_\_\_\_\_\_ Wool

\_\_\_\_\_\_\_ Gold

\_\_\_\_\_\_\_ Plastic

\_\_\_\_\_\_\_ Grapes

\_\_\_\_\_\_\_ Air

**Directions:** Using the picture, make a list of all the factors that are abiotic and biotic.

Abiotic Biotic

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