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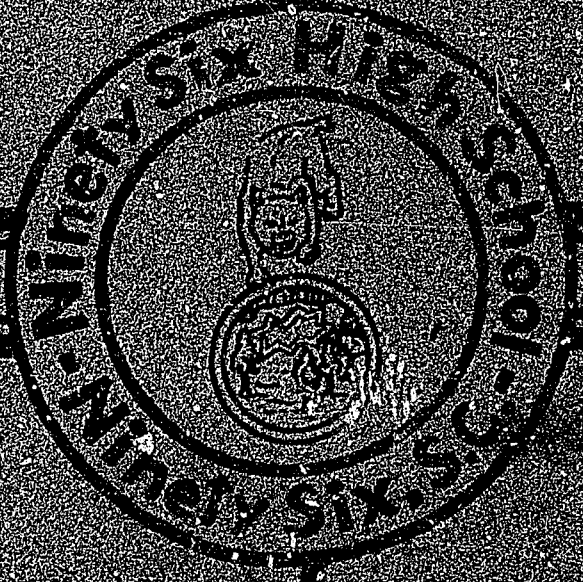
ABSTRACT

Presented is a Learning Activity Package (LAP) study on ecology. This LAP, designed for use as a part of a high school biology course, contains a rationale for teaching the topic, a list of student objectives (stated in behavioral terms), a list of resources (readings, audiovisual aids, handouts, student activities, group discussion topics), and a student self-evaluation. Each of the three sections of this LAP emphasizes field observation. (PEB)

LEARNING ACTIVITY PACKAGE

ECOLOGY



BIOLOGY 124

LAP NUMBER 36

WRITTEN BY Bruce Rhoden

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RATIONALE

During this year's work we have examined some of the many questions that face man concerning life. We have found a few answers, but by the same method, have opened even more unexplored corridors. As we come to our last LAP, we will have an opportunity to study the relationships between the biotic and alustic factors. Your work will be primarily concerned with field observation and will be evaluated primarily upon how well you are able to carry the tasks to completion.

Section I

BEHAVIORAL OBJECTIVES:

After completing the objectives and activities you:

1. Will be able to list, in order, the seven basic groups used in the Linnaeus system of taxonomy. (1-a)

2. Will be able to classify man into the seven groupings identified above. (1-a)

3. You will describe the way in which the taxonomic group species differs from all others in the Linnaean hierarchy. (1-a)

4. You will be able to describe at least two criterion other than gross anatomy that are used in taxonomic work. (1-b)

5. You will demonstrate your ability to correctly collect, press, mount and key out plants by completing a herbarium collection including each of the following:

   At least one representative from each of the following groups taken from taxonomic chart handout.

   1. one of the algae phyla
   2. class ascomycetes
   3. class basidiomycetes
   4. class deuteromycetes
   5. class lichenes
   6. phylum bryophyta
   7. class filicineae
   8. class gymnospermae
   9. class angiospermae
      subclass dicotyledienae (5 representatives)
      subclass monocotyledonae (2 representatives)

   Animals

   10. phylum platyhelminthes
   11. phylum annelida
   12. phylum arthropoda (at least two classes and three orders of insects)
   13. Phylum chordata (three representatives including at least three different classes)

You will be evaluated on the following creterion

1. correctness of procedure
2. neatness of specimen and identification
3. completeness of collection
4. field collection data book (teacher will describe the notebook)

Resources Section I

Readings:

1. The Study of Biolgoy, Allen Baker (a) 635-637 (b) 644-647

2. How to Know series insects H. E. Jaques
   trees H. E. Jaques
   plant family H. E. Jaques
   weeds H. E. Jaques
   mosses and liverworts
   aquatic plants

3. A Guide to the Natural World Life pp. 23-81

4. Plant Systematics PSCS pamphlet No. 23

Visuals:

20. Classification Characteristics F.S. Eye-Gate

Handouts:

30. Taxonomic chart
31.

Activities:

1. Answer the following questions on page 649 in The Study of Biology Allen and Baker. 7 and 8

Group Discussion

1. Large group (a) use of taxonomic keep
   (b) collection, pressing and mounting plants
   (c) collection, preserving and labeling of animals

Section II

BEHAVIORAL OBJECTIVES:

After completing the resources and activities, you will be able to complete the following objectives.

6. You will be able to apply the following terms to a discussion of ecology: (a) ecological niche
   (b) habitat
   (c) ecosystem
   (d) pyramid of mass
   (e) pyramid of energy

7. From a given description of an ecosystem, you will be able to construct a food chain and a food web and identify each level as producer, consumer and decomposer.

8. You will demonstrate your understanding of the carbon, nitrogen and water cycles by predicting the affect that changes involving these cycles would have on a given situation in an ecosystem.

9. From a given description of a symbiotic relationship, you will be able to identify the relationship as: mutualism, commensalism, parasitism, interspecific competition, intraspecific competition.

10. You will demonstrate your understanding of ecological succession by comparing the pioneer stage community with that of a climax community in a given ecosystem.

Resources Section II

Readings:

1. The Study of Biology Allen, Baker pp. 652-672

2. Ecology Time,Life publication

3. Biological Science Kecton pp. 707-760

Visuals:

20. "The Pond Community" an example of succession F.S.

21. Symbiosis: Strange Partners in Nature" Life F.S.

SELF EVALUATION

1. Distinguish between the terms "habitat" and "ecological niche."

2. From the description of a ecosystem given on page 683-684 of the book The Study of Biology, construct a food chain.

3. Based upon your knowledge of the nitrogen cycle, what advantages are there to farmers to rotate their crops with legumes such as clover?

4. Describe the role of photosyntheses in the carbon cycle.

5. Give an example of mutualism.

TAKE THE PROGRESS TEST.

Section III

BEHAVIORAL OBJECTIVES:

After selecting a study plot and having it approved by your teacher, you will complete the following:

1. You will construct a plot map including a vegetation inventory, coverage, abundance, and frequency of the plant life as directed by your teacher.

2. You will determine the frequency of the following groups of animals within the range of your plot.

   (a) mammals (b) birds (c) insects (d) soil organisms

3. You will collect at least three readings on different dates of the following factors:

   (a) wind velocity
   (b) temperature
   (c) light intensity (several readings through out plot)
   (d) moisture content of soil
   (e) perculation rate of soil
   (f) soil chemistry (pH, composition)
   (g) rainfall (one reading for period of study)

6. You will make at least two of the following measurements of aquatic factors.

   (a) temperature
   (b) dissolve oxygen
   (c) free CO_2
   (d) pH
   (e) total suspended solids
   (f) one other factor of your choice

5. After all of your data has been collected, you should check to see that you have correlated your reading with the plot map by means of some symbol and that all data is in a form that can be easily compared to all other aspects of your study.

6. You will write a paper including a summary of the relationships between the biological and physical aspects of your community. Assume that your study area is to become a camp ground, what changes might this impose on the community and what suggestions do you have as to how the area might be designed in order to maintain the ecological aspects of the area. The length of your paper will be between five and eight pages depending on your scope and needs.

Resources Section III

Readings:

1. Field Ecology E. A. Phillips (section throughout)
2. Freshwater Ecology Andrews (good source for tests)
3. Environmental Pollution Andrews (good source for tests)
4. Water and Wastewater Treatment Handbook Dept. of Health
5. Environmental Pollution reprint from Wrold Book Encyclopedia

Visuals:

20. "Tropical Rain Forrest" F.S. Eye-Gate
21. "Desert Bromis" F.S. Eye-Gate
22. "Terrestrial Ecology" F.S. and record Eye-Gate

Handouts:

1. "Vegetation Strudture Key"

Games:

"The Ecology Game" Coca Cola Co.