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A Guide for Extending Nature Lessons at the Yakima Arboretum

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A Guide
for
Extending Nature Lessons
at the Yakima Arboretum

A Project Report

Presented to

The Graduate Faculty

Central Washington University

In Partial Fulfillment

of the Requirements for the Degree

Master of Education

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by

Kathleen Brown

May 1996

A GUIDE FOR EXTENDING NATURE LESSONS

AT THE YAKIMA ARBORETUM

by

Kathleen D. Brown

May, 1996

The importance of providing a hands on natural environment curriculum was examined. Sources from 1938-1996 were found supporting the importance of such a curriculum. A search was conducted on the availability of a natural habitat curriculum that used a local resource. The search discovered the Yakima Arboretum had seven areas of interest along with a packet of brief lesson suggestions. These lessons were extended to include classroom activities that would provide students with background knowledge prior to a field trip to the Arboretum.

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CHAPTER 1

BACKGROUND OF THE STUDY

Introduction

Teaching students about ecology and the importance of environmental awareness is a growing concern among educators and curriculum specialists. According to Angell (1995), an environmental education experience is a strategy for learning a vast range of skills and knowledge throughout every grade level and discipline. One method of instruction supported today is firsthand experience. Experiencing lessons in a student's own backyard is being advocated by environmental education experts and school districts. Angell (1995), stated that "ultimately, the most effective learning experience is going to take place in the real environment itself " (p. 1). The Yakima, (WA) School District's philosophy (1988) includes this statement, "Teachers should go beyond the classroom and include community resources in a variety of lessons" (p. 5).

Using a local community resource is not a new concept. Earlier, Dewey (1938) had the same concern. He suggested teachers know how to utilize their surroundings, physical and social, and extract from them all that they have to contribute to building experiences that are worth while. If an education system is based upon the necessary connection of education with experience, teachers must become acquainted with local community resources. Dewey believed learning resulted from experiences which were real, life-like, and available to the learner for firsthand examination, questioning, and cognition.

Becoming familiar with a local environment is one way to experience nature first hand. According to Elwood and Shaw (1995), "getting in touch

with nature is the first step to discovering how all living things are connected to each other and the environment" (p. 7). Each aspect of an ecological system depends on the intricate interactions of its separate parts for the continued existence of the system. Learning about the many aspects of a local habitat will encourage an appreciation of the neighborhood environment, and the world's environment in general.

One of the goals in the Yakima (WA) School District 's philosophy. (1988) is to have students describe the basic ways organisms, within a living community, depend on other living things. The Yakima Arboretum, and its surrounding habitat, is a natural resource for ecological studies. The Arboretum contains numerous opportunities for lessons on environmental education and can become a laboratory setting to demonstrate how plant and animals depend on each other for survival.

Another Yakima School District goal is to have students participate actively in the learning process. Students should be challenged, inspired, and able to see the relevancy of what they learn. Using a local park for a resource will help students make a connection between what is taught in the classroom and what is in their own community. The Yakima School District (1988) believes, "teachers should utilize a variety of methods, and the community, as a laboratory to promote learning" (p. 4). For the purposes of this project the community laboratory will be the Yakima Arboretum.

Statement of the Problem

According to O'Neal and Skelton (1994), sensing and experiencing the environment firsthand has a profound educational and motivational value.

They indicated outdoor parks are valuable educational resources and could serve as outdoor laboratories.

Few environmental curriculum guides exist for the elementary teacher. According to Asmussen (1970), one of the problems of outdoor programs has been that students and teachers have no study guide for activities designed to give the program continuity and overall meaningfulness.

Lessons for intermediate and upper level grades are available but these lessons have to be adapted for primary grade students. Lessons about plants and animals are abundant. However, the problem is how to plan and organize a group of lessons that will integrate the environment and all its aspects into the curriculum.

Statement of the Purpose

The purpose of this project was to develop an environmental education curriculum that uses a Yakima area resource. The lesson plans and activities developed for this project incorporated aspects of the habitat found at the Yakima Arboretum. Project ideas were collected and lessons developed accordingly. Background information about the habitat of the Arboretum was incorporated into the project. Field trip lessons as well as follow up activities were included. This project was intended to decrease, not eliminate, the amount of time an instructor spends gathering information and creating lessons based on a field trip to the Yakima Arboretum.

Definition of Terms

For the purpose of this project the following terms have been defined.

Bench Mark

A bench mark is a method of determining at what level a student has achieved mastery of a subject. These bench marks are being developed and refined and will be used statewide.

Community

A community is a group of plants and animals living and interacting with one another in a specific habitat.

Conservation

Conservation is the controlled management of natural resources, such as forests, streams, soil, and animals.

Ecology

The branch of science concerned with the relationship between organisms and their environment.

Environment

Environment is the total surroundings in which an organism or a group of organisms lives.

Habitat

Habitat is defined as the place where a plant or animal naturally lives and grows. A habitat may be a very small area or may cover miles of territory within a given set of climatic conditions.

Outcome Driven Developmental Model (ODDM)

A method of creating and sequencing lesson plans to meet the requirements of the Yakima School District.

Wetland

A lowland area, such as a marsh or swamp, that is saturated with moisture, especially when regarded as the natural habitat of wildlife.

Limitations of the study

The purpose of this project is to provide Yakima area teachers with an environmental curriculum for extending classroom lessons at a local nature habitat. The lessons and activities developed for this project contain ideas for use at the Yakima Arboretum. The Arboretum contains numerous opportunities for environmental studies. The lessons and activities were developed for third grade students. With some adaptation these lessons could be used for a younger age group. Teachers outside the Yakima area could adjust these ideas to fit the opportunities at a park near their school.

CHAPTER 2

REVIEW OF THE LITERATURE

A review of literature was conducted to determine if a need existed for an environmental education curriculum and to determine the most effective methods of teaching environmental education to primary level students. The possibilities of utilizing a local park, as an environmental laboratory resource, were investigated. Initially, there was some concern that environmental education could be considered only a science curriculum. Research indicated that environmental education crossed all content areas.

Educators are interested in developing outdoor lessons to enhance students' knowledge of the environment. Environmental conservation is a common subject taught in schools today. According to Bergeson (1996) Washington state's new Essential Learning Benchmarks will be the main driver of the state's efforts to improve student learning in all areas of education including environmental education . These guidelines will be used throughout Washington State as curriculum frameworks. Specific guidelines will be given on what students will be expected to know about the environment, and its preservation. Sumrall and Criglow (1995) maintain many recent science and environmental education reform initiatives have called for changes in the way science is taught. These changes include developing activities that eliminate rigid boundaries between subjects. Sumrall and Criglow found they could apply scientific ways of thinking to all subjects through thematic teaching. They indicated thematic units can span the disciplines of science, geography, history, mathematics and language arts. When a topic is taught across the curriculum, students can see the connections between science and daily life.

Environmental education is a perfect topic for developing problem solving skills and integrating numerous subject areas. A local nature habitat could be the perfect backdrop for environment and preservation studies. Allard (1994) advocated taking field trips when possible. However, when field trips are not possible he suggested bringing parts of the field trip habitat into the classroom to study. He maintained students use a variety of skills examining habitats, even in the confines of the class setting. Observation and record keeping skills were honed. Identification and labeling specimens could be done in the classroom. Students could also note the changes in a habitat through cause and effect lessons.

Bones (1994) contended, "environmental education seeks to build awareness" (p.13). Through first hand experiences, students gain an understanding of the integral relationship between nature and man. When a student is familiar with frogs and their intricate life cycles, the impact of spilling pollutants into area streams and rivers becomes more apparent. Before we can strive to preserve nature we must first be familiar with all the aspects of it, plants and animals alike. Current educators are advocating hands on lessons. The instructor can include a variety of teaching formats when developing lessons on environmental education. Science and nature studies lend themselves easily to reading, writing, and math. Students with an interest and talent for the arts, would find environmental education contained numerous subjects for painting, drawing and poetry writing. DeBuhr (1995) agreed with this view:

> It is also clear that an interactive science program whereby children are actively engaged in problem identification, investigation, data collection and analysis, and synthesis is far better than passive approaches that only utilize lecture, observation, or watching. (p. 5)

Today's educators are being asked to stimulate student interest and provide activities for students who are not motivated by passive lessons. However, the idea of students having first-hand learning experiences is not new. Dewey (1938) believed that in order to build experiences that are worthwhile, teachers should know how to utilize community resources. If an education system is based upon the necessary connection of education with experience, teachers must become intimately acquainted with local community resources.

Hall (1955) described school journeys in Great Britain with children going out into the country to study nature and geography. According to Hall, field trips gave students accurate firsthand information. The use of field trips allowed the classroom to be expanded and gave the child a closer view of the outdoor environment. Lewis (1993) believes, "the experiential approach toward education brings students out of the classroom by encouraging them to resolve real world issues" (p. 1). By becoming familiar with a local park, the importance of environmental preservation becomes personal.

This concept can transfer to other areas of the community. Watson (1994) contends, " there is pride in ownership. An effective way of minimizing vandalism is the building of student attitudes of pride and ownership in public property" (p. 4). When students have pride, and a feeling of ownership in a local park and the community, the problem of vandalism is often eliminated. Stimulating an interest and respect for the environment is just the beginning of teaching students about the preservation of our planet.

According to Moody (1994), the study of our environment can "relate environmental sensitivity, knowledge, problem solving skills, and values

clarification to every age, but with special emphasis on environmental sensitivity to the learners' own community in early years" (p. 11). The emphasis of environmental education is not just to discourage pollution and the destruction of natural habitat. The goal is to encourage an awareness and intimate knowledge of all aspects of the environment and how they affect each other.

Dean (1975), contends there is a link between understanding of the environment and a concern for the environment. She also points out that the outdoor experience can link several disciplines. Science, humanities, social studies, art, and geography can all be enhanced through outdoor environmental studies. Cadet and Bruchac (1989) agree with the importance of linking the various educational disciplines. They proposed that instructors, "keep tying the meaning of each activity to the overall theme. The interactions between living things and their environment completes the circle of the study of ecology" (p. 10).

Trying to connect the classroom lessons to the students' real world has been a concern for over 25 years. Stark (1968) stated, "it is not enough for children to remain in classrooms and look out at the world. They must directly experience some of the excitements, pressures, and problems of the world and reality" (p. 2). Stark believed, utilizing the environment to enhance school curricula would awaken curiosity, stimulate additional interest, and teach aesthetic appreciation of the environment.

More recently, Moody (1994) has given instructions for how teachers can use field trips, excursions and outdoor education in the instructional curriculum at school. In his words, "each field trip must be integrated with the curriculum and coordinate with classroom activities which enhance its usefulness" (p. 27).

The field trip can be a great teaching opportunity. Going outside the

classroom helps students make a connection between classroom lessons and the world outside the school setting. Mollo (1994) found that studying trees was an excellent way to introduce environmental concepts to children. She recommended taking students outside where they can observe a variety of trees. Her students were encouraged to use all of their senses to observe a tree, and then describe orally what they saw, and felt, comparing shapes and textures. Mollo said, "These outdoor excursions are wonderful opportunities for your students to revel in the beauty of nature and to develop environmental awareness" (p. 30). Building awareness of our surroundings is vital to environmental education and using a local park or even the school playground can encourage concern for protecting all aspects of our planet.

According to Wittich and Schuller (1967), the use of community resources is a less foreign and a highly interesting way of becoming informed about the social, economic, and physical aspects of the environment. Schools encourage the use of community resources. This interaction between the community and the school helps bridge the gap between classroom and a student's home.

Cohen (1992) stated:

> We are beginning to recognize that environmental education is an important component in the preservation of our planet. Relatively little research has been conducted on children's cognitive understanding of ecological issues. Several factors contribute to this scarcity of information. First, children growing up in contemporary Western society have little direct experience with living things or with complete chains of physical systems. Second, ecologically based learning among young children must allow for real interactions with

> nature, a difficult perquisite for learning, particular among children living in settings far removed from the concerns of natural ecological events. (p. 259)

Cohen and Trostle (1990) stipulated that an issue common to both children and adults, was the need to find more effective ways of promoting ecological awareness and behavior directed toward conservation and preservation of our limited natural resources. Among very young children, this problem has assumed critical importance as educators strive to instill a greater concern for the reasonable use of our endangered planet. According to Cohen and Trostle, "experiences designed to increase children's awareness of important ecological issues must be developmentally appropriate, take place in real settings, and involve the child's active exploration" (p. 304). Ignorance about the environment is a real threat to the preservation of the environment. It is vital to expose as many students and adults to environmental issues as possible. Finding ways to integrate all the aspects of ecological awareness into the classroom is difficult and time consuming.

Heimlich, Lorson, and Wagner (1993) found that very little time was spent in the classroom on environmental education. They felt, "students should have an opportunity to be educated so they can properly respond to environmental problems that will arise in their lives" (p.1). Before we can expect our students to respect the problems facing our environment, we must educate them about what an environment is.

Oppenheir (1995), defined environment as the physical, biological, and social setting for living things. The definition of environmental education has not changed in the past 25 years, but our perception of the schools' role in providing education about ecology has. One of the most significant changes

was an increasing emphasis on connectivity. In the future, this concept of connectedness will expand beyond relations between environmental problems and issues previously viewed as social and economic. For children to recognize the role that humans play in the environment, they need to observe plant and animal life first hand. If students are to help protect the environment, they need a willingness to act, as well as an understanding of ecological and scientific fundamentals. Lessons in natural settings need to have follow-up discussions that help children recognize man's relationship to everything around him.

According to Koran (1983), parks and other informal settings offer opportunities to enhance environmental learning beyond formal education. Field trips provide novel, thought provoking experiences that stimulate students' curiosity and interest, which in turn facilitated information processing. The park setting also encourages a desire to find methods of habitat protection. Students who are intimately familiar with all aspects of a habitat are greatly concerned with preventing destruction and damage to the area surrounding "their" park. Outdoor education can make learning meaningful to the students.

Tamarkin and Bourne (1995) indicated that an integrated hands-on science curriculum can empower students. After attending an elementary science integrated project program, they declared, hands-on integrated science projects enable students of all ability levels to explore and learn. Hands-on activities can touch on all learning styles and be integrated naturally into other subjects in the curriculum. Direct involvement with nature promoted ecological understanding. Campbell and Burton (1994) adopted a science method that highlights hands on activities, cooperative learning, literature based instruction, cultural diversity, student choice and portfolio assessment.

By doing so, Campbell and Burton believed they could meet the needs of the myriad of learning styles present in the classroom.

The variety of instructional methods gave students the background information to look at the problems of environmental preservation and their role in protecting the environment from several points of view. According to Lewis (1991), environmental studies could be the interdisciplinary core that many reports on school reform and many curricula specialists recommend. When done right, ecological studies cut across all the disciplines. They incorporate hands-on activities, problem solving opportunities, and even awareness of the local community.

Perry and Rivkin, (1992) found that elementary teachers felt they did not have to be experts in science. When teaching new concepts, teachers felt they could learn along with the students, demonstrating looking things up, observing, and wondering, thereby supporting the students' curiosity. When an instructor is not knowledgeable about a course of study, it becomes easy to neglect the subject matter. However, when both the teacher and the student are exposed to first hand exploration of a subject, they both benefit. The teacher becomes a better resource for the student and the student gains valuable information. Charron and Jones, (1992) concurred when they suggested leaving the resource guide on the shelf and asked students to tell them about what science activities they would like to explore outside the classroom. In doing so, science became much more appealing to instructors and students.

Dighe, (1993) wrote, "outdoor experiences are the only authentic foundation for environmental education" (p.58). Touching and seeing the student's local environment is an important aspect of environmental education. Children's feelings about nature are fundamental to any environmental

education program. These feelings about the natural world are not likely to grow and thrive in the classroom. According to Dighe (1993), when children are outside, they not only began to feel comfortable in the outdoor environment, they also learn about nature the way young children learn best, by experiencing it. Getting children outdoors to touch and experience nature is the starting point of environmental education.

Science curricula in early childhood education have meant the investigation of objects and close observation of butterflies and bugs. New content, new experiences, and development of strengths are needed. Educators should emphasize the environment and the role humans play in using and protecting the earth's resources. According to Rivikin (1992), "humans affect their environments, and vice versa. Each child's interactions with the world affect not only the child but the world" (p.4). Bringing environmental education into primary classrooms and emphasizing each student's part in protecting the "bugs and butterflies" will add to the students ownership of the earth and all its inhabitants.

Ford and Smith (1994), stipulated that when teachers discussed environmental awareness, they often told students how all living things were mutually dependent. If one living thing is disturbed, there are consequences for the other organisms in that environment. After telling students this information, teachers moved on to another topic, thinking they had increased students' knowledge about the environment. However, Ford and Smith believed more in depth lessons were needed to help students understand the inter- relatedness of living things. Visits to an outdoor habitat, along with discussions about environmental needs, can enhance lessons.

Students need to see it and touch it to truly understand it. According to Watson, (1995) the goal of environmental education is, " to enhance knowledge and appreciation of the natural environment and to promote habits, skills and attitudes which will lead to the appreciation and preservation of our natural environment " (p. 1). Karmozyn, Scalise, and Trostle (1993) found that children learned more about themselves in relation to the world through sensory experiences with the natural environment. They engaged children in an activity called "beautifying the playground". Students picked up litter, pulled weeds, planted flowers, and made bird feeders. The authors wrote that these activities taught responsibility and respect for all living things. Ron Hirschi is just one instructor who is certain students gain valuable information from outdoor experiences. Hirschi (1994) suggests environmental activities can and do span a variety of curriculum areas. A land lab, or local park habitat, can be used for observations, recording, and all sorts of "discovery learning".

Many schools are celebrating Earth Day. However, is one day, or even one week of ecology studies enough? Needleman (1995) indicated setting aside a special day, like Earth Day, promotes respect and appreciation for nature. However, teachers need to emphasize earth's uniqueness on a daily basis. Lifelong habits for environmental responsibility can be taught through a variety of hands-on lessons and activities. Whenever possible, these lessons should be taught in a natural environment. Caduto (1989), agrees with this concept when he suggests, "help children to experience the subject first hand. If the lesson is about trees take them to a tree in the backyard, forest, a park or school grounds. If you are studying water, take them to water" (p. 10). Instructors can extend this concept. When studying trees, have your students

use all their skills to internalize information about trees. Observe trees, count rings on a tree, draw leaves of trees and write a poem about trees.

One example of this type of daily learning experience is journal writing. Walley (1992) had her students keep a journal on their seasonal visits to a park. Keeping park journals helped children focus on nature and see its beauty. At the end of the year, the students performed for their parents, sharing drawings, stories, and poems they wrote about plants. Walley's comment was, "the audience watched in awe as the children shared their written and visual creations. These nature memories would be cherished by the parents and children who created them" (p. 270).

Allard, (1994) wrote that combining field-trips, with long term indoor activities, could extend environmental lessons throughout the year. He stated he had great success with lessons he called, "pond in a jar". In these lessons, students collected samples of pond water containing a variety of microorganisms. They studied the mud and plankton samples, as well as minnows in jars. These pond habitats could be studied throughout the day. They were easily available and portable. According to Allard, (1994) An entire habitat could be studied in the school classroom.

Matsikas (1995), found "Bugs" were a perfect format for teaching a variety of skills in his third grade classroom. He started sharing insects with his students while taking a college course. What started as a few anecdotes about the problems of collecting and identifying specimens soon turned into an entire curriculum. Working in small groups students observed the specimens with hand lenses, listing the features they believed to be characteristic of all insects. Later the observations were pooled and common sets of insects traits emerged. The diversity of insects met both the art and the science objectives.

The students created three dimensional insects with paper mache and painted pictures. The research on insects spanned numerous curriculum areas. According to Matsikas (1995), "Once the bug hit, students examined, collected, researched insect societies and participated in numerous lab activities."

Ferrell (1995) states, "Exploring a pond habitat can open students' eyes to an unexplored world." Through brainstorming students discovered what they knew about ponds and what they wanted to know. The class illustrated what lives in a pond and did group drawings in class of pond habitats. These habitats led into classification lessons and creative writing assignments.

After the students gained some background information on the life of a pond the class was ready to take a field trip to a local pond. With ample adult supervision the students experienced first hand the abundant life a a pond. The students collected specimens and gathered information to take back to the class for further study. According to Ferrell (1995), the pond lessons provided "an opportunity for both teachers and young children to discover that there's much more to the water than meets the eye" (p.37).

State and Local Guidelines

The Environmental Education Guidelines for Yakima Washington Schools (1980), include many of the same goals as the environmental experts reviewed for this paper.

Goal 1. The student will develop knowledge of the components of the environment and their interactions. (p. 9)

Goal 2. The student will value the environment as the basis of our physical lives, economy, and emotional well-being. (p. 19)

Goal 3. The student will apply personal decision making skills to enhance the environmental quality. (p. 29)

The Yakima School District Educational Philosophy (1988), includes these statements and course outcomes:

1. Learning should be an active process which has meaning for all students. Students should be challenged, inspired, and able to see the relevancy of what they learn. (p. 1)
2. Teachers should go beyond the textbook by utilizing a variety of methods and the community as a laboratory to promote learning. (p. 1)

Course outcomes for elementary education include;

1. Describe the basic ways that organisms within a living community depend on other living things, i.e., prey-predator and food web. (p. 7)
2. Participate in community field trips to learn about the natural resources of Yakima. (p. 4)
3. Observe and record how the changes in the seasons affect living things. (p. 5)

Hands-on lessons help children understand the interdependence of our environment. Caduto and Bruchac (1989), state

> Lead children to touch and understand a grasshopper, a rock, a flower, a ray of sunlight, and you begin to establish connections between the children and their surroundings. Have them look at a tree-feel it, smell it, taste its sap, study its many parts and how they work. Help them to understand how it is part of a forest community of plants, animals, rocks, soil and water. Build on these experiences with activities that help them to develop a conservation ethic. (1)

Summary

According to Grumbine, (1988) "outdoor education programs can benefit children's physical, emotional, and spiritual growth, as well as intellectual growth" (p. 5). After reviewing the literature, I believe there is serious concern for the quality and quantity of environmental education for young children. Nearly all the literature reviewed indicated that environmental education needed to include outdoor experiences.

Combining a variety of academic disciplines and skills within a theme like environmental education enhances learning. In Billings' (1993) words:

> Environmental education teaches an understanding of how our eco [sic] systems work and what strategies are needed to keep them healthy and productive. The process can happen anywhere... at home, in classrooms, at work, within the community and on playgrounds, parks or wilderness areas. Environmental education integrates the sciences, language arts, mathematics, social studies, health and physical education by using the environment as a model. It teaches the skills and creates the awareness necessary for individuals and institutions to make environmentally sound decisions. (p. 2)

CHAPTER 3

PROCEDURE

A comprehensive review of literature on environmental education was conducted. This review clearly indicated a need for environmental education at the primary level. Research also indicated innovative methods for teaching environmental education need to be developed.

The opportunities for environmental education lessons at the Arboretum were considered. A facility local educators can use for this type of nature study is the Yakima Arboretum. It is near enough for classes to visit and is open to the public for visits after school. Local schools are taking advantage of the Arboretum's close proximity. Walking field trips are common. Classes can visit during the various seasons and note the differences that occur in the numerous plants and animals with the weather changes of Yakima Valley.

The Yakima Arboretum is a tree museum, a botanical garden created for the study of trees. It includes ten acres of natural riparian wetland which showcases indigenous (native) plants as well as 30 acres of exotic (non-native) plants. The Arboretum has several varieties of shrubs, vines, grasses, flowers, aquatic plants, as well as a Japanese garden with a pond and fountain. The Arboretum is not a park. A park offers open space for recreational purposes. The Yakima Arboretum is a botanical garden developed and maintained for science study and education. To protect the plants, active recreation is limited and no pets are allowed. The Yakima Arboretum has over 1,000 species of plant life.

The Arboretum attracts many forms of wildlife. Hummingbirds, quail, ducks, and Canadian geese are just a few of the birds you might see. The

wetland area is used by many birds as a refuge during migration. Insects, numerous amphibians, reptiles, rabbits, and beaver all enjoy the natural habitat the arboretum provides. The inhabitants of the Arboretum are all interdependent, each living thing is an integral part of the cycle of life. If one part of the cycle is disturbed a chain reaction is commenced.

The Yakima Arboretum encourages teachers to take their students on tours of the area. A packet is provided with a map of the areas of interest. This packet includes brief lesson suggestions. The purpose of this project is to provide classroom lessons that will give the students a broad knowledge base to build on. When they visit the arboretum first hand they will have some background knowledge for making observations and recordings of what they observe.

CHAPTER 4

THE PROJECT

The purpose of this project was to develop an environmental curriculum using a Yakima area habitat teacher could use to extend and enhance classroom lessons. The curriculum format utilized was in concurrence with the Outcome driven developmental model used by the Yakima School district.:

1. Subject or topic area was listed.
2. The objective was clearly stated.
3. Suggested materials were listed.
4. Prerequisites were recommended if necessary.
5. Cue set or best shot instructional process was developed.
6. Closures and extensions were recommended.
7. Arboretum connections were provided.

The lessons developed for this project contain lessons for the classroom as well as field lessons. Primary grade instructors could pick lessons to supplement a variety of topics. This project was intended to incorporate a number of subject areas, including art, science, language arts and social studies. The lessons could be used individually or as an entire unit.

A Guide to the Yakima Arboretum

The Arboretum has several areas specified for lessons and observation. These areas are:

1. The pond area, where students can explore wild plants living in and around the pond. Students will be able to observe the natural habitat of beaver, frogs, turtles, snails, muskrat, ducks, and many others.

2. The deciduous tree area where students can explore the different characteristics of deciduous trees.
3. The wetland area and activities allow the student to see how wetlands absorb water during floods, and how wetlands clean dirty water. Students can also see natural composting, and the animals wetlands attract.
4. The dawn redwood area where students can see a species of tree that was once thought to be extinct. This species of tree is over 50 million years old. It was discovered living in China and in 1944 seeds were brought to the United States. The dawn redwood is nicknamed the "dinosaur tree" because it was living on earth when dinosaurs roamed the earth.
5. The evergreen area where students can study various evergreens. They can compare the differences in needles, pine cones, and bark.
6. The Ginkgo area where students can see and learn about the unique characteristics of the ginkgo tree.
7. The flower area where students can observe several varieties of flowers. They can observe the parts of flowers, and discuss pollination.

CHAPTER 5

SUMMARY, RECOMMENDATIONS AND CONCLUSION

The purpose of this project was to explore the need for environmental education, discover the recommended method of teaching environmental education, and provide an appropriate curriculum that would incorporate a local resource. Experts believe there is a great need for environmental education. In the Yakima school district environmental education has become a part of the student learning objectives.

Hands-on, real life experiences were highly recommended. Students relate to new concepts best when lessons are taught in a linked sequence rather than in isolation. Field trips are a good way to bring students in touch with a natural environment. Classroom lessons prior to and after a field trip can make it more meaningful.

Designing a curriculum to connect with a field trip can be time consuming. This project has taken advantage of a local resource, the Yakima Arboretum, and designed a nature curriculum that coincides with the opportunities there. The Yakima Arboretum offers a variety of plant and animal life for students to observe. It includes a wetland area. The lesson units in this project are trees, birds, seeds, wetlands, freshwater life, and insects.

Funding for field trips is often limited so many classrooms may only visit the Arboretum one time during the school year. Many schools are within walking distance of local parks. A trip to a park may provide students with opportunities to reinforce the dryland curriculum. It would be best to utilize the wetland curriculum when a field trip to the Arboretum is planned.

The lessons can be adapted to meet the needs of primary or upper

elementary grade students. The Arboretum offers lesson suggestions that will further enrich a field trip experience.

The connections between man and his environment should be a common thread in all lesson discussions. The interdependency between the plants and animals of a habitat and the impact of man on this habitat is essential to a students understanding of environmental preservation.

In the words of Chief Seattle:

> The Earth does not belong to man; man belongs to the Earth. Man did not weave the web of life, he is merely a strand in it. Whatever he does to the web he does to himself. All things are connected like the blood which unites one family. All things are connected. (cited in Caduto & Bruchac, 1989, pp 4-5)

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APPENDIX A

A GUIDE TO THE YAKIMA ARBORETUM

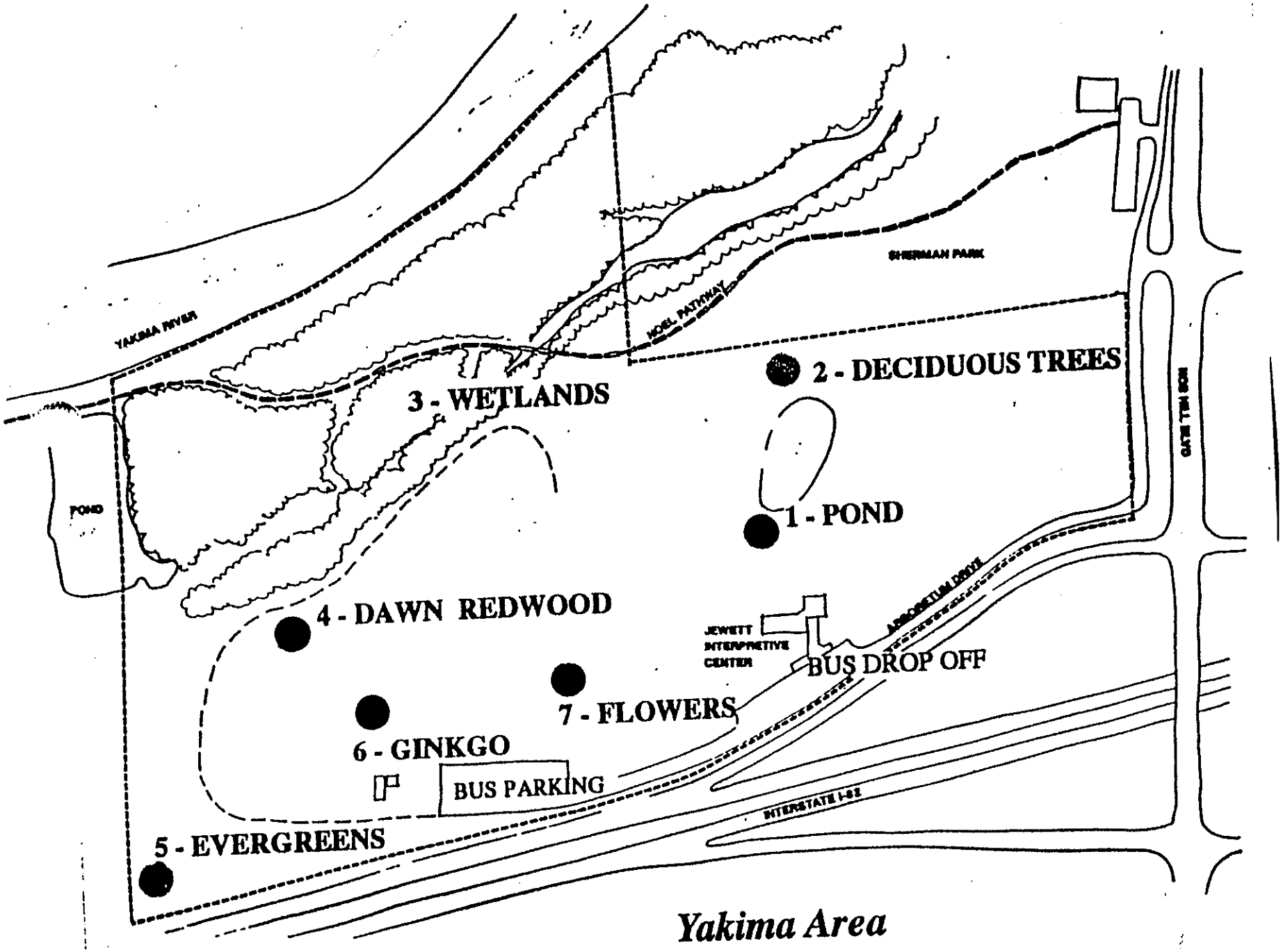
TABLE OF CONTENTS

Tips for a trip to the Yakima Arboretum

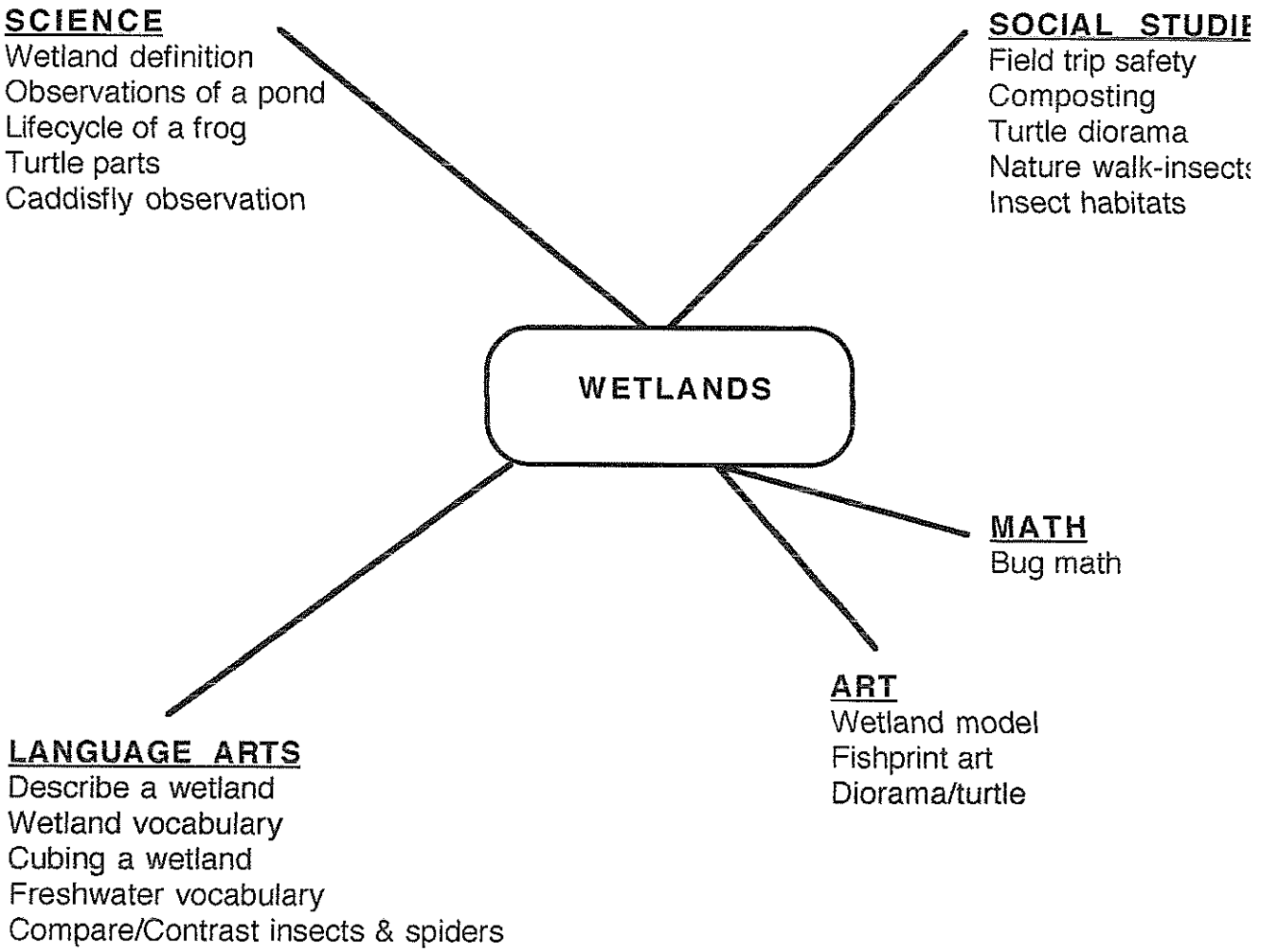
The Arboretum offers these suggestions to make your tour a successful adventure.

1. A restroom stop before boarding the bus will save quality tour time.
2. Disembark at the loading pad in front of Jewett Center. Follow the walkway towards the entrance and lead the children onto the gravel path on your right. this path leads to the pond-station number one. You will see orange cones at each station and critical turning points.
3. One person should report to the office to sign out the lesson pack, and clipboards. Your students do not need to bring any materials, except for drinking water (optional). We will assign one clipboard for every two students.
4. If students need restroom facilities during the trip, a maximum of three students may use the restrooms at one time. We often have meetings at the center so they need to keep voices at a whisper.
5. The Japanese garden is not part of the tour.
6. When entering the wetland area, do not stop on the asphalt pathway, since bikes passing make it dangerous.
7. All trees have metal identification bands bearing the common and botanical names. These are located on the south side of the tree.

Observe and enjoy, do not destroy!



Yakima Area
Arboretum


SCIENCE
Wetland definition
Observations of a pond
Lifecycle of a frog
Turtle parts
Caddisfly observation
SOCIAL STUDIE
Field trip safety
Composting
Turtle diorama
Nature walk-insects
Insect habitats
WETLANDS
MATH
Bug math
ART
Wetland model
Fishprint art
Diorama/turtle
LANGUAGE ARTS
Describe a wetland
Wetland vocabulary
Cubing a wetland
Freshwater vocabulary
Compare/Contrast insects & spiders

UNIT 1

WETLANDS

Unit 1 Wetland

Lesson 1	Define and describe a wetland
Lesson 2	Wetland vocabulary
Lesson 3	Observations
Lesson 4	Composting and its benefits
Lesson 5	Wetland models
Lesson 6	Field trip safety
Lesson 7	Cubing the wetland

RESOURCES

Suggested Materials

Books:
Squish: a wetland walk by Nancy Luen

Exploring animal worlds through indoor/outdoor experience by W. Shedd

Keepers of the earth; Native American stories and environmental activities for children by M. Caduto and J. Bruchac

Videos:
Natures 1/2 acre - VS3489
The Wetlands - VS1130
Wetlands of the Pacific NW -D10039

Footwork:

Collect pond water and set up observations tables. Check with the Yakima Arboretum to borrow their back pack kits.

SUBJECT: Define and Describe a wetland

OBJECTIVE:
As a result of this lesson the students will describe and define a wetland.

Wetland:
A lowland area, such as a marsh or swamp, that is saturated with moisture, especially when regarded as the natural habitat of wildlife.

MATERIAL:
1. large chart paper
2. markers
3. dirty water sample/preferably from a stream, or pond
4. coffee filters
5. sponge

PREREQUISITE:
Read Squish: a wetland walk by Nancy Luen

CUE SET:
Using a dirty water sample demonstrate what happens when the water is poured through the filter. The water goes in dirty and comes out clean. That is what a wetland does for the water supply. The water from the gravel pit to the north of the arboretum goes into the arboretum wetland dirty and comes out cleansed.

BEST SHOT:
Brainstorm what a wetland is and how it helps the environment.

A wetland can be a swamp, bog, or marsh. The common ingredient is water and how the water has saturated the soil. The wetlands help control flooding by absorbing excess water. A wetland is home to numerous birds, amphibians, reptiles, mammals, insects and spiders.

CLOSURE:
Describe how a wetland will absorb excess water during a flood. Have students drop a sponge into a small container of the dirty water from the filter demonstration. Have students share observations.

EXTENSION:
The Yakima Arboretum area contains a large wetland area. How can this wetland act as a sponge? Have students check newspaper articles about the flooding that occurs during snow run off.

Create a wetland model demonstrating the sponge ability of a wetland.

Wetland Questionnaire

Wetlands are commonly called marshes, swamps, or bogs.
Describe a wetland you have seen.

_____

_____

_____

Name some animals that may live in a wetland.

_____

_____

_____

If you were an animal, why would you want to live in a wetland?

_____

_____

_____

Explain how wetlands are valuable to people.

_____

_____

_____

Circle the activities you would like to do in a wetland.

Boating	Hunting	Draw pictures of animals
Fishing	Photography	Inspecting mud
Bird watching	Clam digging	Studying plants
Studying animals	Observing insects	Looking for animals

SUBJECT: Vocabulary words

OBJECTIVE:
As a result of this lesson the student will list and define new vocabulary words.

Wetlands - A lowland area, such as a marsh or swamp, that is saturated with moisture, especially when regarded as the natural habitat of wildlife.
Saturated - To soak, fill, or load to capacity.
Arboretum - A place where an extensive variety of woody plants are cultivated for scientific, educational, and ornamental purposes.
Habitat - The area or type of environment in which an organism or ecological community normally lives or occurs.

MATERIAL:
1. Video-*Fabulous Wetlands* from the ESD
2. dictionaries
3. chart paper and markers

PREREQUISITE:
Students should have read Squish by Nancy Luen
Having a personal dictionary will be helpful.

CUE SET:
What do we know about wetlands? Why do you think they are important to our environment?

BEST SHOT:
Remind the students that the film will help them answer questions about wetlands. Have the students break into small groups and each group will be given a word to define. Watch the film.

CLOSURE:
The groups will write their definition on large chart paper and share with class. Drawings and words can be used in the definitions.

Add the new words to the students personal dictionary.

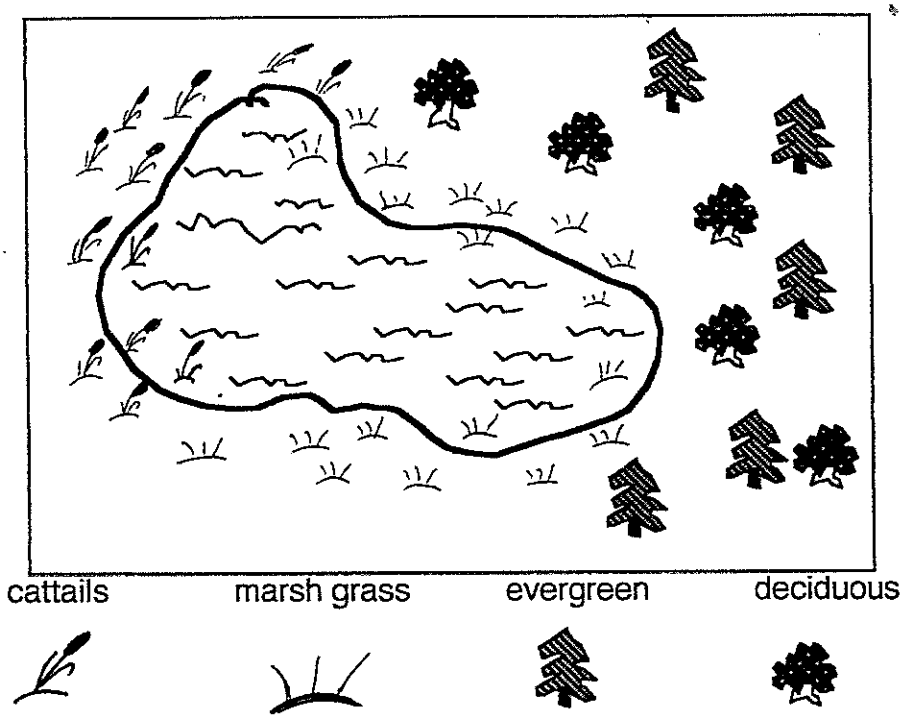
EXTENSIONS:
Add the definitions to the weekly spelling list. Each student can choose a word about the Yakima Arboretum to present to the class, this can be written or illustrated, use your imagination.

Create a wetland map including some of the new vocabulary words.

Wetland map

This activity can be as simple or complex as the skill level of the students involved.

Use this activity as an extension for the wetland vocabulary.



SUBJECT: Observe and record

OBJECTIVE:
As a result of this lesson the students will acquire the ability to record information about the environment.

MATERIAL:
1. notebooks for each student
2. 2-3 pencils for each student
3. several aquariums, or caged animals (ask teachers in your building if students can observe and record what they see in the various animal and fish habitats found in the school)

PREREQUISITE:
Brainstorm why recording and observing can be helpful.

CUE SET:
Have the students gather around an aquarium. Tell them to watch the aquarium for several minutes. List what was observed. Demonstrate how to give a detailed picture through words.

BEST SHOT:
Have small groups of 2-3 students examine and record what they observe in the various habitats in the school.

CLOSURE:
Have students tell the description of the habitat without telling what it was. See if the rest of the class can guess.

EXTENSIONS:
Write an observation of a person, place or thing at home and have students guess what it is they are describing.

When visiting the Yakima Arboretum or any park, observation notes will be valuable tools. Students can not always bring a specimen back to the room, so detailed observation records can help students make identifications.

SUBJECT: Compost pile

OBJECTIVE:
As a result of this lesson the students will work in groups of 3-4 to design and develop a compost pile.

MATERIAL:
1. small containers- shoe boxes, gallon jugs (with a wide mouth), or small grocery boxes. Check with the cook or custodian for possible containers.
2. dry leaves
3. organic yard waste (clippings from grass and shrubs)
4. brown paper bags
5. soil

PREREQUISITE:
Brainstorm what a compost pile is. Does anyone have a compost pile at home?

CUE SET:
A gardener has to work to make the soil soft by adding organic matter. In a wetland, mother nature makes the soil soft naturally.

BEST SHOT:
Demonstrate how to layer the soil, torn paper bags, organic yard waste and a small sprinkle of water. Have students place containers on a shelf and remind them to sprinkle the pile and turn in once a week. Students also need to keep data of their observations once a week. After a couple of weeks have students share with the class what is occurring in their pile. If the compost smells funny, cut back on the water or add more organic yard waste.

CLOSURE:
Remind students that some items of waste will not decompose. Some groups could add a tin can, bottle, plastic etc. See what happens.

EXTENSIONS:
When visiting the arboretum wetland, note the natural composting going on in the forest.

Have students hypothesize how this fluffy soil will help the plants grow.

SUBJECT: Wetland model

OBJECTIVE:
As a result of this lesson groups of students will demonstrate what a wetland is by creating a model.

MATERIAL:
1. Several shallow plastic containers, 9x12 is a good size
2. modeling clay
3. Styrofoam or large sponge
4. a variety of building materials/toothpicks, small twigs, pipe cleaners, grass, weeds, animal figurines
5. construction paper
6. markers
7. pictures of wetlands
8. cotton swabs-cattails

PREREQUISITE:
Students should have had a lesson on the definition of a wetland.

CUE SET:
Read science and nature guide to freshwater life. Note the pictures of the creatures they might find at the Yakima Arboretum.

BEST SHOT:
Demonstrate how to put modeling clay in one half of the pan to represent the dry land area, the Styrofoam will be the wetland area. Suggest students plant trees, grow weeds and whatever else they might find in a wetland area.

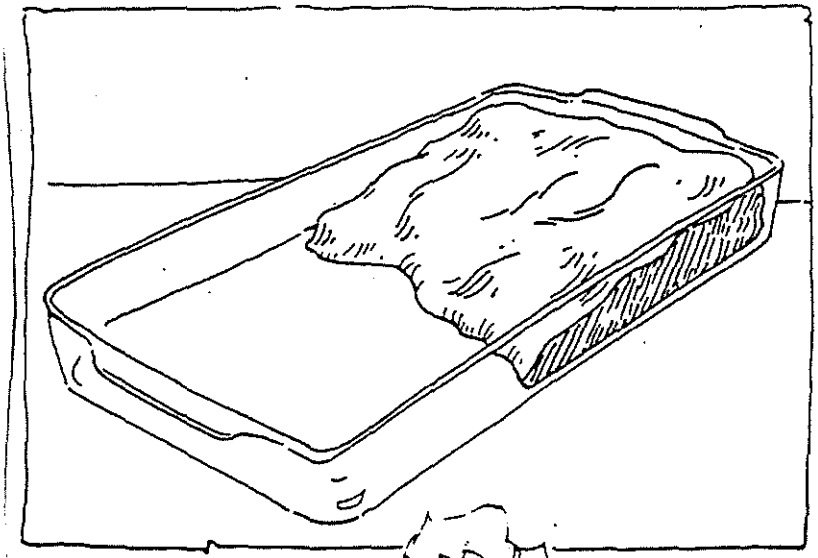
Have students begin work. Remind them to seal the edges of the dry land area so the water will be contained.

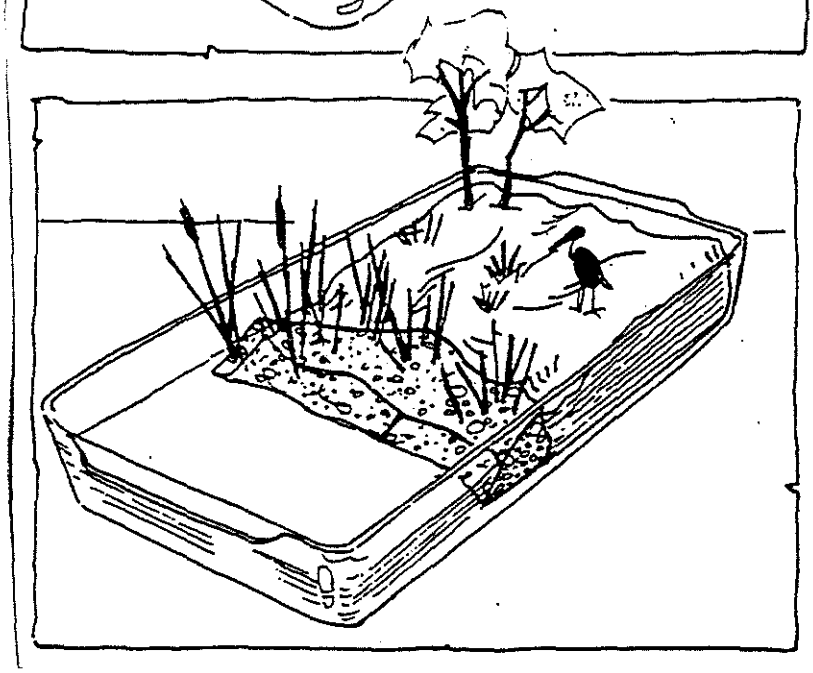
Add the water to one end.

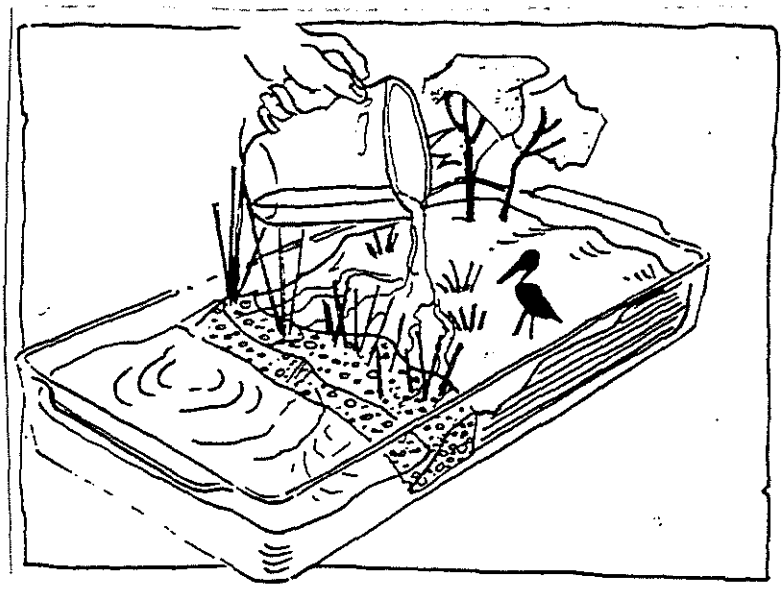
CLOSURE:
Display models and have students explain how they created their parts.

EXTENSIONS:
Have students explain what might happen if a road was put through a wetland.

The gravel pit near the wetland area will not continue to be used as a gravel pit. What would happen if it was filled in?







SUBJECT: Safety

OBJECTIVE:
As a result of this lesson the students will list safe practices when doing environmental observations.

MATERIAL:
1. Large chart paper for brain storming ideas
2. Colored markers
3. plastic snake
4. potted plant to hide snake in

PREREQUISITE:
Brainstorming skills will help students list ideas on safety.

CUE SET:
Demonstrate how a person might encounter an unsafe situation exploring. Hide the snake in the plant and then show what could happen if an investigating student is not careful when looking at the environment. This lesson should not be meant to scare students, just to warn them of dangers.

BEST SHOT:
Ask students for ideas on safe exploring practices.

1. Use the buddy system, never explore alone.
2. Let an adult know where you are going and when you will return.
3. Leave wild animals alone.
4. Don't bother nests, or dens of animal.
5. Ask permission of property owners before exploring.
6. Stay on the path whenever possible.
7. Wear long sleeves, and pants if in tick territory.
8. Don't build fires.

CLOSURE:
Role play some exploring situations. Have students demonstrate safe practices.

When visiting the Yakima Arboretum, take the list of rules and remind students to follow them.

SUBJECT: Wetland cube

OBJECTIVE:
As a result of this lesson the students will cube what has been learned about a wetland.

MATERIAL:
1. Cube forms
2. Chart paper of wetland attributes
3. Markers
4. All the research materials available about wetlands

PREREQUISITES:
This lesson will be done at the end of the unit so students can use all the new information about wetlands to create a cube.

CUE SET:
Show students the sample cube. Today they will create their own cube of wetland information.

BEST SHOT:
Using the charts of information students will be required to fill in the 6 sided cubes.
1. compare/contrast the wetland to; parking lot, shopping mall, city, etc.
2. illustrate some part of the wetland area; animal, bird, plant, insect, etc.
3. give a brief definition of a wetland
4. tell why wetlands are important
5. write an acrostic poem or a poem of their choice
6. list at least 5 descriptive words that give word picture of wetland

CLOSURE:
Share cubes with the class and display them for class members.

EXTENSIONS:
Share cubes with another class to teach about wetlands.

cut out this section

COMPARE/CONTRAST

cut out this section

POEM

PICTURE

DEFINE

WHAT DO THEY DO?

cut out this section

cut out this section

DESCRIBE

UNIT 2

FRESHWATER LIFE

Unit 2 Freshwater life

Lesson 1	Vocabulary
Lesson 2	Observation
Lesson 3	Fishprint art
Lesson 4	Lifecycle of a frog
Lesson 5	Turtle parts
Lesson 6	Diorama
Lesson 7	Adopt a site

RESOURCES

Suggested Materials

Books:
Amphibians and Reptiles by P. Baucich

Tracks in the Wild by B. Bowen

Freshwater life by S. McKeever

Life in ponds and streams by W. H. Amos

Videos:
Turtles - VS1018
Turtles Fun with Nature - VS4621
Amphibians, Frogs Toads and Salamanders - VS8969

Footwork:

Collect tadpoles if possible. Gather posters and pictures of freshwater life. Set up an observation table for observing specimens.

SUBJECT: Vocabulary words

OBJECTIVE:
As a result of this lesson the students will define the following vocabulary words.

1. Reptile
2. Amphibian
3. Fish
4. Crustacean
5. Insect larvae

MATERIAL:
1. Books on reptiles, amphibians, fish crustaceans and insect larvae.
2. Posters from the forest service depicting fish and reptiles.
3. Dictionaries
4. Encyclopedias

PREREQUIST:
Students need to have dictionary skills and personal dictionaries.

CUE SET:
Numerous animals depend on wetland areas for their homes. What could I see at the Yakima Arboretum wetland? What types of animals live in a wetland area?

BEST SHOT:
Becoming familiar with the freshwater life of a wetland area will help students differentiate what type of animal they are trying to identify.
1. Reptile-Reptiles have skin covered in scales, or hard plates and shields. Some have claws on their toes. Alligators, turtles, snakes, and lizards are reptiles.
2. Amphibian-Amphibians have moist skin with no scales. They do not have claws on their toes. They lay jelly-like eggs in water which hatch into tadpoles. Frogs, toads, newts, and salamanders are amphibians.
3. Fish-Fish are cold-blooded aquatic vertebrates, characteristically with fins, gills, and a streamlined body.
4. Crustacean-Crustaceans have a hard, plated skin, long feelers for finding food, and many pairs of jointed legs. Crayfish, shrimps and prawns are crustaceans.
5. Insect larvae-Most insect larvae found in a wetland are nymphs. They have bodies that are divided into three parts, head, middle (thorax), and rear (abdomen).

CLOSURE:
Have numerous cutout pictures of freshwater life. Students could sort, graph, label or create a habitat collage and place animals in the appropriate places.

EXTENSION:
List all the animals found at the Yakima Arboretum.

Name

Identification

Fantastic Frogs Mini-Book (Part 1)

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Common Frogs and Toads

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SUBJECT: Aquarium observations

OBJECTIVE:
As a result of this lesson the students will observe life in aquariums and record them in notebooks for further use.

MATERIAL:
1. Three cheap plastic aquaria from local pet store, or use large candy jars with large openings, check with your school cook for possible containers.
2. Pond weed
3. Pond mud
4. Pond water
5. Cheese cloth
6. Magnifying glasses
7. Student observation notebooks

PREREQUISITE:
Observation skills lesson.

CUE SET:
Today the students will be creating 3 different habitats. Each habitat will contain pond water. Students can help the teacher create the habitats. Fill half of the first container with pond weeds and fill it up with pond water. The second jar should be half filled with pond mud and filled up with pond water. The last jar should only contain pond water.

BEST SHOT:
Explain that in the next twenty four hours the life in the containers will become visible. Demonstrate how each student can use a magnifying glass to observe what has crawled out of the weeds and mud. Point out that each student will record what they have observed in their notebook.

CLOSURE:
At some point each day a classroom helper can report observations on a large chart or to the class during sharing time.

EXTENSIONS:
Students can make predictions about why each habitat is existing as it is. What would happen if the water was left in the sun, cold, foreign substances added?

How is life at the arboretum affected by climate changes, construction, and pollution?

SUBJECT: Fish print art, appreciation for the beauty of fish

OBJECTIVE:
As a result of this lesson the students will create a print using a fish

MATERIAL:
* parent volunteers or older student volunteers will be very helpful for this project

1. Newsprint
2. large fish/purchased at a fish market, this fish can be used several times but must be kept refrigerated between uses. If possible different types of fish may be used
3. poster paint or ink
4. newspaper to cover tables
5. paint brushes for applying paint to fish

PREREQUISITE:
No prerequisite needed.

CUE SET:
Today we are going to create our own fish prints. These prints will help us see the details of a fish anatomy.

BEST SHOT:
Demonstrate how to apply the paint on the fish. Ink works the best, but poster paint can be used. Explain how all areas of the fish should be painted to capture all the details of the fish. Be prepared for spills and some squeamish students. Maybe rubber gloves will be a benefit to some students.

CLOSURE:
After the prints are dry, have students trim excess paper and display on bulletin board.

EXTENSIONS:
Leaf rubbings, rubbings of other plants, rocks, bark, shells and even money can be done to demonstrate how rubbings can capture texture details.

Fish are an important part of the food chain. What animals at the Yakima Arboretum benefit from fish? Scavengers, eagles, bigger fish and man all depend on fish.

Name

Fish Facts

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SUBJECT: Hatching tadpoles

OBJECTIVE:
As a result of this lesson the students will collect frog eggs and create a tadpole habitat for room observations. This lesson can be done in small groups with several habitats created or one for the entire group.

MATERIAL:
1. Half a cup of tadpole eggs
2. Aquarium tank
3. tap water that has stood outside to get rid of the chlorine or pond water
5. rocks and water plants
6. cheese cloth or wire netting to protect eggs from birds

PREREQUIST:
Information about the lifecycle of a frog.

CUE SET:
Today we are going to create a habitat for our own tadpoles. This habitat will require care and the entire class will be caretakers.

BEST SHOT:
List the items that will be needed to create a habitat for tadpoles. Put a sequence of events on chart paper. This will help students check if they are following the proper directions. Picture sequencing can be done as a group and is helpful for students who are not yet reading. Using a model, the instructor can demonstrate the appropriate method of carrying water, placing rocks etc.

CLOSURE:
Place the habitat in an appropriate area. Tadpoles like warm water, but may die if they get too warm. Make some predictions on how long you think it will be before changes will be noticed with our tadpoles.

EXTENSIONS:
Jobs should be assigned to students on a rotating basis.

1. Tadpoles need to be fed soon after hatching, small pieces of boiled lettuce leaves or a few rabbit food pellets every 3-4 days will be sufficient.
2. The water needs to be changed if it becomes too murky, and the tank needs to be kept full.
3. It takes 5-6 weeks for the legs to appear, at that time small rocks for them to climb on can be added to the tank.
4. Release your froglets near the pond where you collected their eggs.

How do frogs impact the lifecycle of other animals at the Yakima Arboretum? What if all the frogs were eliminated?

SUBJECT: Turtle parts

OBJECTIVE:
As a result of this lesson the students will recognize and label the main parts of a turtle.

MATERIAL:
1. Totally Turtle by Anna Mearns
2. Chart paper
3. Markers
4. A labeled diagram of a turtle and its parts
5. Construction paper

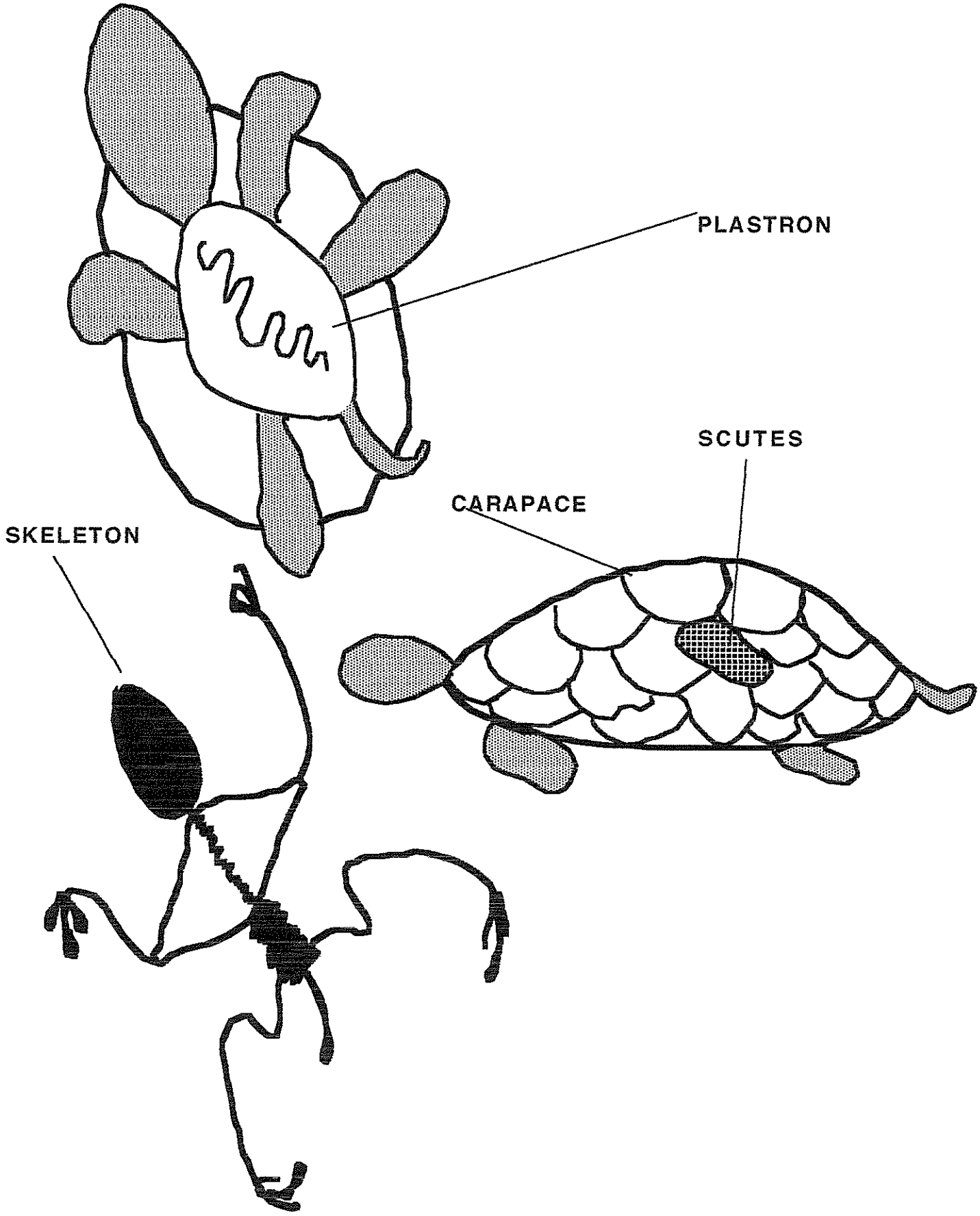
PREREQUISITE:
Read Totally Turtle by Anna Mearns

CUE SET:
This lesson will reinforce and build new vocabulary. Turtles have distinct and easily identifiable body parts.

BEST SHOT:
After reading Totally Turtle have students label the parts of the turtle on the chart paper.

CLOSURE:
Have students create their own turtle from construction paper and label each part. The skeleton should be separate from the carapace and plastron. These can be held together with a brass brad or let the students experiment with different methods of construction.

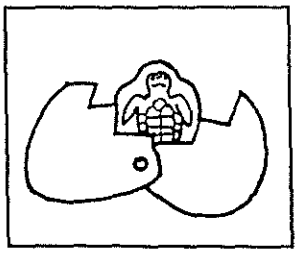
EXTENSIONS:
Create a diorama of a turtle habitat.

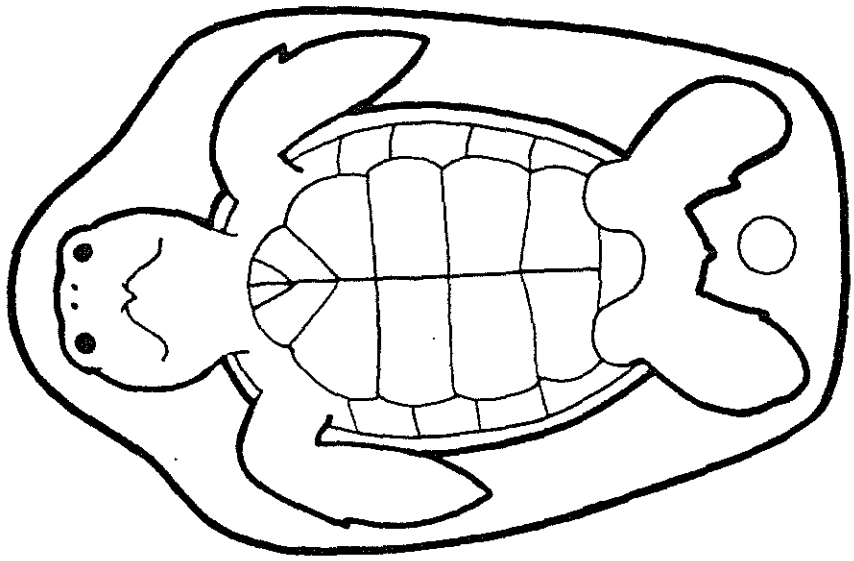

PLASTRON
SCUTES
CARAPACE
SKELETON

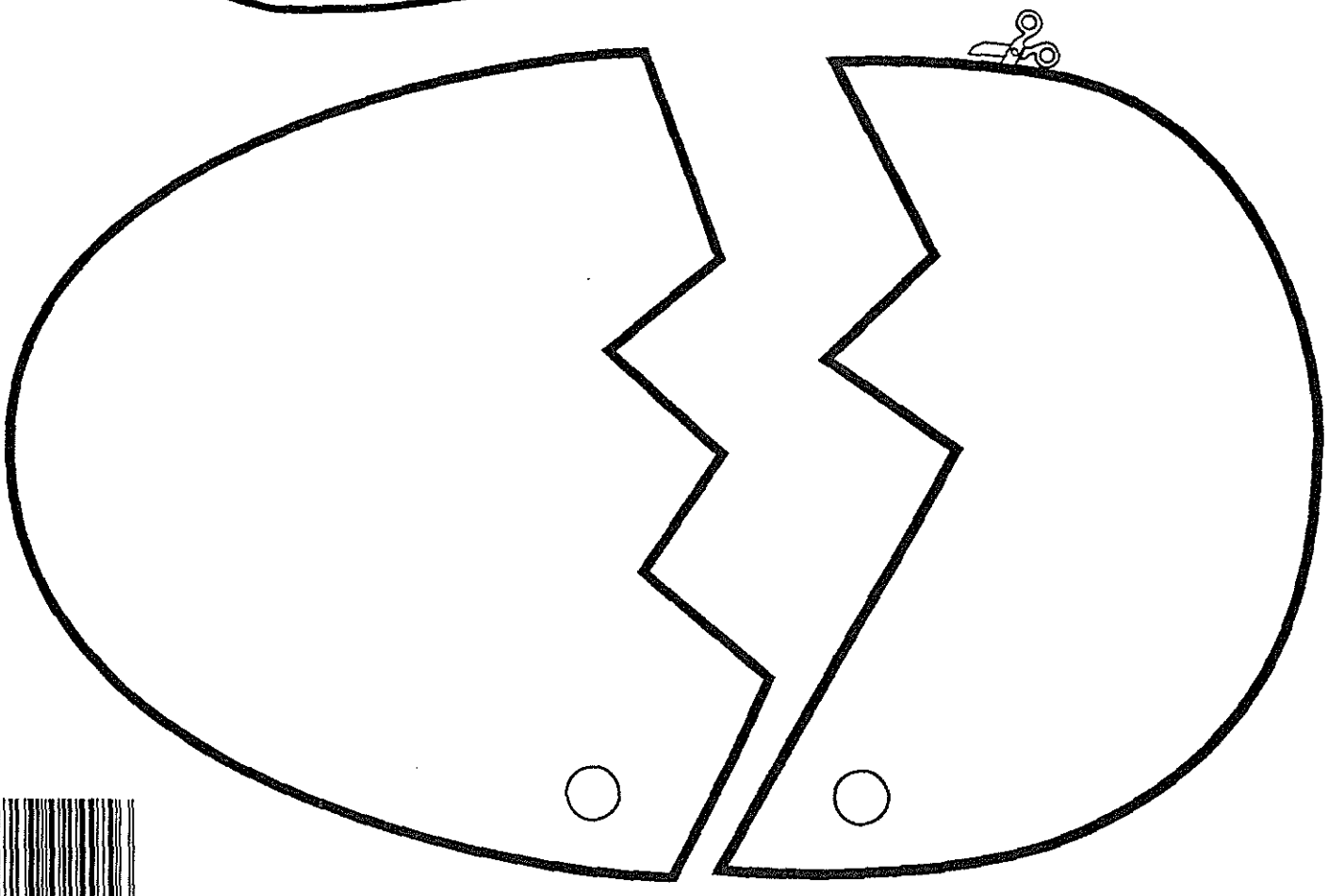
Name _____ Skill: Motor coordination

Many Reptiles Hatch From Eggs

Cut out the sea turtle.
Cut out the egg pieces. Punch holes.
Push a paper fastener through the egg pieces.
Then push it through the turtle and fasten.







SUBJECT: Adopt a site

OBJECTIVE:
As a result of this activity the student will combine all their skills of observation, recording, and predicting to adopt a pond, stream, park, or playground.

MATERIAL:
1. Notebooks for observation
2. adoption site- this can be done as a class project or done on the playground if no other site is available to a student

PREREQUISITE:
The students will do this activity at the end of the unit. This lesson will use all the new skills the students have mastered.

CUE SET:
Each student can help ensure that our environment is not polluted and that the animals and plants in a habitat are healthy.

BEST SHOT:
Explain that each student will adopt a site. After they have chosen a site they will draw a map of the site and give a detailed description to the class of the site. If possible this site will be observed over several seasons. Noting what changes take place in winter and in spring. The maps should be large enough to display in the classroom. Notes should be made giving detailed descriptions of what type of animal and plant may be found on the site.

CLOSURE:
The site maps should be displayed in the classroom for further observation notes and animal migration patterns.

EXTENSIONS:
Throughout the year updates will be made on the site. Notes should be taken on the condition of the site.

Things to watch for:
garbage, sewage, algae, bad smell, oil or gas, dead animals, plants and fish. If a student notes a dramatic change, an adult should be notified.

SUBJECT: Turtle diorama

OBJECTIVE:
As a result of this lesson students will demonstrate their knowledge of a turtle habitat.

MATERIAL:
1. Shoe boxes
2. Construction paper and markers
3. Wallpaper
4. Modeling clay for turtle models
5. Small artificial flowers and plants

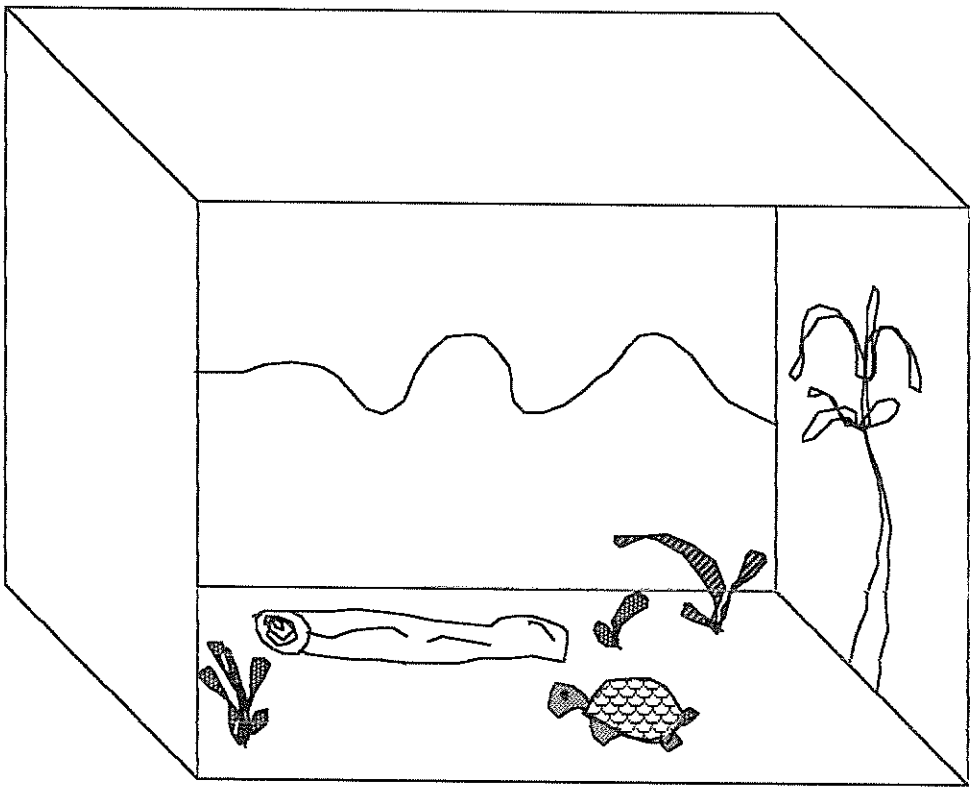
PREREQUISITE:
Students should have studied turtles and their habitats

CUE SET:
Display examples of a diorama. Explain that the students will be creating their own turtle habitat. Brainstorm what might be found in a habitat.

BEST SHOT:
Students will need to use their observation notes and all the information they have about turtle habitats. Explain that all the dioramas will be different but that they need to contain the correct parts of a turtle habitat.

CLOSURE:
Display the diorama and have students evaluate and share any problems or helpful hints about how the diorama was created.

EXTENSIONS:
Add other inhabitants of the turtles habitat, ie. birds, snakes, insects etc.



Extensions:

1. Have students label the parts. This can be done with small numbers that will correspond to a key on the side of the box.
2. Have magazines for students to cut pictures of plants and animals from.
3. This could be a team project or an individual project.
4. Sculpy clay is soft and pliable and easily molded, it will harden in the oven on a low temperature and is great for creating small creatures. This clay does not alter it's shape when it dries.
5. Brainstorm what would happen to the turtles habitat if a parking lot was built nearby, or a shopping center covered it.

* Be sure to showcase these creations, maybe the library or a hallway display case.

UNIT 3

INSECTS AND SPIDERS

Unit 3 Insects and spiders

Lesson 1 Nature walk
Lesson 2 Define an insect/spider
Lesson 3 Ven diagram comparing insects and spiders
Lesson 4 Insect habitats
Lesson 5 Caddis fly observations
Lesson 6 Bug math

RESOURCES

Suggested Materials

Books:

Bees, wasps and ants by G. Fichter

Bugs by N. W. Parker

Lets find out about insects by D. Knight

Insects by Theresa Martin

When flying animals are babies by E.R. Schwartz

Videos:
Insects the Little things that run the world - ESD

Insects life cycles - VS3788

Insect Zoo - VS1343

Spiders and how they live - VS1133

Spiders Backyard science - VS4158

Footwork:

Have students collect insect samples. Gather and collect samples from staff, and check with staff at upper level schools in the area. Send newsletter home and check to see if any parents may have access to insect collections. Set up an observation site with magnifying glasses and specimen critereia.

SUBJECT: Insects-Nature Walk

OBJECTIVE:
As a result of this lesson the students will increase their observation skills by looking for insects and spiders in their natural habitats. The students will keep a record of where they found the specimens and do simple drawings of the insect.

MATERIAL:
1. Notebooks-students made or premade.
2. Pencils

PREREQUISITE:
Students should have a beginning knowledge of insects and where they may be found in their natural habitat.

CUE SET:
Read Insects of the United States and Canada by Susan McKeever. This book gives great ideas on where insects may be found and the pictures are very appropriate for younger students. The teacher should take this guide along to use as a reference on the nature walk.

BEST SHOT:
Demonstrate how the students should note their findings in the notebooks. The teacher could supply blank pages for students or have some premade pages with simple pictures to to help students in their identification and classification.

CLOSURE:
Share with the class the insects they found and attempt to make the appropriate identification of the specific species.

EXTENSIONS:
Do a math graph of the the most common insects found.

* Remind students not to touch insects they find. Some insects can be hazordous, students must use caution when inspecting insects and spiders.

SUBJECT: Insect/Spider definitions

OBJECTIVE:
As a result of this lesson the students will list the definitions of a spider and an insect.

MATERIAL:
1. Books and posters on insects and spiders
2. Dictionaries
3. Encyclopedias
4. Personal dictionaries

PREREQUISITE:
This is an introductory lesson and no prerequisite skills are needed except listening and observation skills.

CUE SET:
Many people think all bugs are the same. Insects and spiders are two distinct species that have common characteristics. These small creatures are important to the food chain and to agriculture. The more we know about them the better we will understand the important role they play in our environment.

BEST SHOT:
Ask the students what they know about insects and spiders and go from there. The teacher can use chart paper to list the differences.

CLOSURE:
At the end of the lesson students can fill in the worksheet provided. Students should keep this worksheet in their notebooks for further reference.

EXTENSIONS:
Cube a specific insect or spider.

<u>Insect</u>
Any arthropod animal of the class Insecta. The adult stage is characterized by 3 pairs of legs and a 3 segmented body consisting of a head, thorax and abdomen, usually having two pairs of wings. Insects include-flies, crickets, mosquitoes, beetles, butterflies and bees.

<u>Spiders</u>
Spiders have a cephalothorax bearing 8 legs, 2 poison fangs, and two feelers, the unsegmented abdomen has several spinnerets that produce nests, cocoons, or webs for trapping insects.

NAME

Spiders & Insects

)ESCRIBE	COMPARE/CONTRAST	FEELINGS
3ODY PARTS	GOOD/BAD	FOOD CHAIN

SUBJECT: Compare and Contrast

OBJECTIVE:
As a result of this lesson the student will compare and contrast insects and spiders using a ven diagram.

MATERIAL:
1. Large chart paper
2. Colored markers

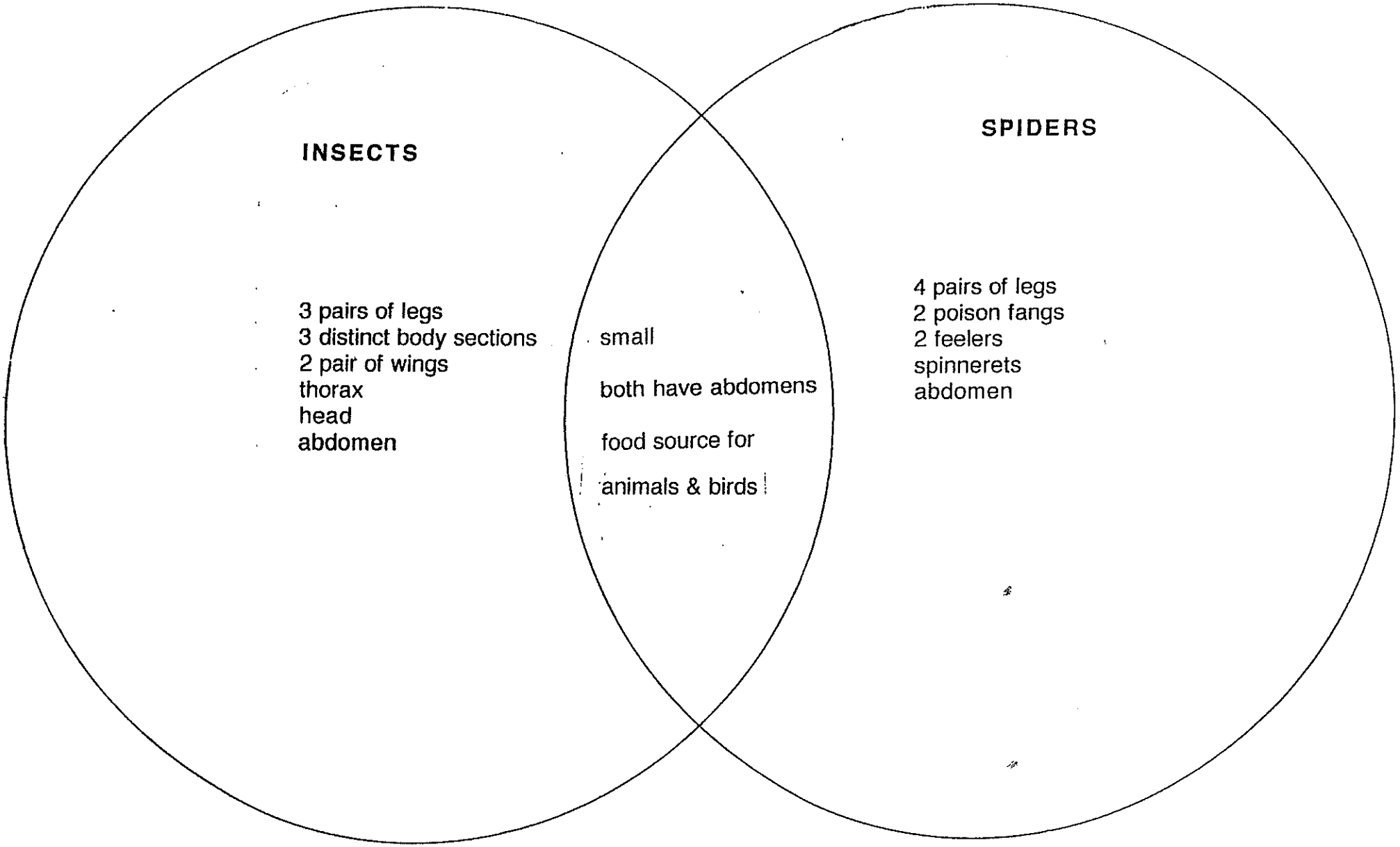
PREREQUISITE:
Students will need to have information on what characteristics determine an insect from a spider. A vocabulary lesson and definition lesson will give the students the prerequisite skills needed to be successful with this lesson.

CUE SET:
Today we are going to discover what makes insects and spiders different from each other and what is the same about them.

BEST SHOT:
Differentiating between an insect and a spider will help students classify specimen they discover on their nature walks. The teacher will invite students to indicate the differences between insects and spiders and then will compare what similarities there are between the two. By using a ven diagram the comparisons will be clear and very visual. Students can create their own diagram to carry with their notebooks. (see attached ven diagram master)

CLOSURE:
Display the diagram for future reference. This diagram can be added to as students gain new information about these species.

EXTENSIONS:
As students discover and identify insects and spiders they can add them to the diagram and indicate if they have any common characteristics.


INSECTS
3 pairs of legs
3 distinct body sections
2 pair of wings
thorax
head
abdomen
small
both have abdomens
food source for
animals & birds
SPIDERS
4 pairs of legs
2 poison fangs
2 feelers
spinnerets
abdomen

SUBJECT: Insect habitat

OBJECTIVE:
As a result of this lesson the students will create a bulletin board of insect habitats.

MATERIAL:
1. 5" x8" note cards
2. Colored butcher paper
3. Yarn
4. Books, videos, and magazines about insects
5. A large stylized habitat of ponds, trees, stones, walls, bushes, sky, ground etc.

PREREQUISITE:
Students will need information about insect habitats.

CUE SET:
Where do insects live? Today we will create a bulletin board that shows where insects can be found.

BEST SHOT:
Each student will investigate an insect and it's habitat. The student will create a list of facts about the insect of his/her choice.
They will include:
1. name of insect
2. where found
3. place in food chain
4. brief description

Students will place note cards on the edge of the bulletin board and stretch the yarn between the fact card and the known habitat.

CLOSURE:
Each student will discuss with the class what he has discovered about his insect.

EXTENSIONS:
Insect dioramas could be created using facts from bulletin board. The students will also use facts in their writing and discussions about insects

SUBJECT: Observation -Caddis fly

OBJECTIVE:
As a result of this lesson the students will observe a caddisfly fly in a classroom setting.

MATERIAL:
1. Small aquaria, including pond water
2. Caddisfly larvae (locate in a pond- they look like small tubes of mud)
3. Observation notebooks
4. Small buttons, shells, and beads

PREREQUISITE:
Students will need to know about the Lifecycle of insects and that many include a larvae stage.

CUE SET:
What is a fly before it is a fly? A fly is a small worm like creature known as a larvae. A caddisfly lives near ponds and streams, its larvae lives in the water.

BEST SHOT:
A caddisfly larvae will create a home of mud and twigs. It finds these building materials in its natural habitat. We will give our caddisfly some different building material and observe his building skills.

CLOSURE:
What would the caddisfly do if it didn't have building material? Why does he need a home to live in. (protection from natural enemies who would like to eat it)

EXTENSIONS:
If the caddisfly could not protect himself what other creatures would be effected, have students brainstorm ideas.

* The lesson will require the teacher to put a small match stick in one end of the caddis case so the students can offer it new building material. This lesson can also be expanded to include several aquaria, one with new material, one with natural material and one found in the pond and left alone. Using several caddisfly larvae will insure the class have ample observation stations.

SUBJECT: Bug math

OBJECTIVE:
As a result of this lesson the students will create math lessons using insect and spider facts.

MATERIAL:
1. Paper for math problems
2. Overhead transparency
3. Manipulatives are optional (an insect and spider ditto is attached)

PREREQUISITE:
The students will need to have spider and insect facts. Insects have 6 legs 3 body parts and 2 sets of wings, spiders have 8 legs and 2 distinct body parts.

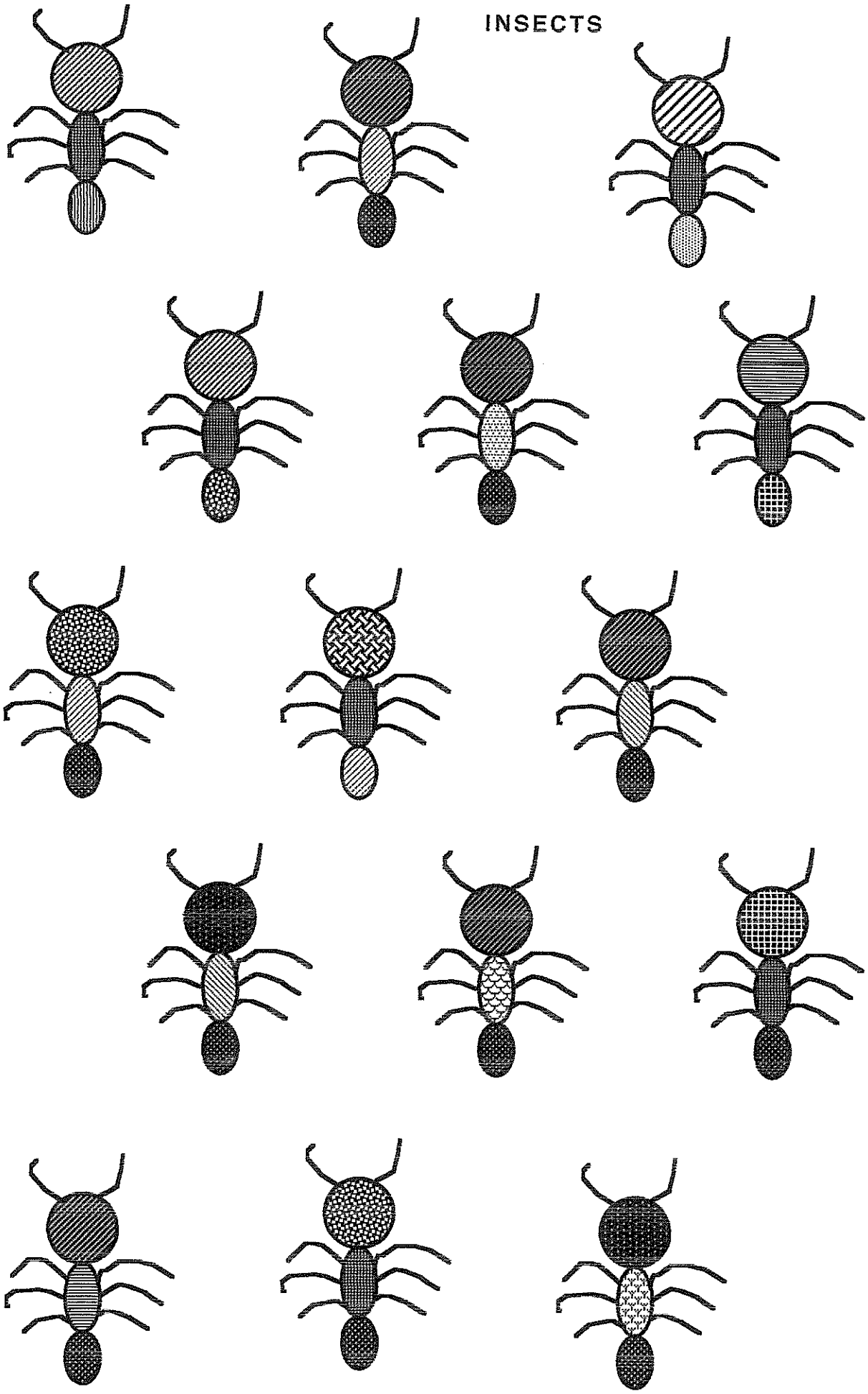
CUE SET:
Today we are going to create our own math problems using insect and spider parts in the story problem.

BEST SHOT:
If we have 3 ants and 2 spiders how many legs would we have?
6+6+6+8+8=36 legs

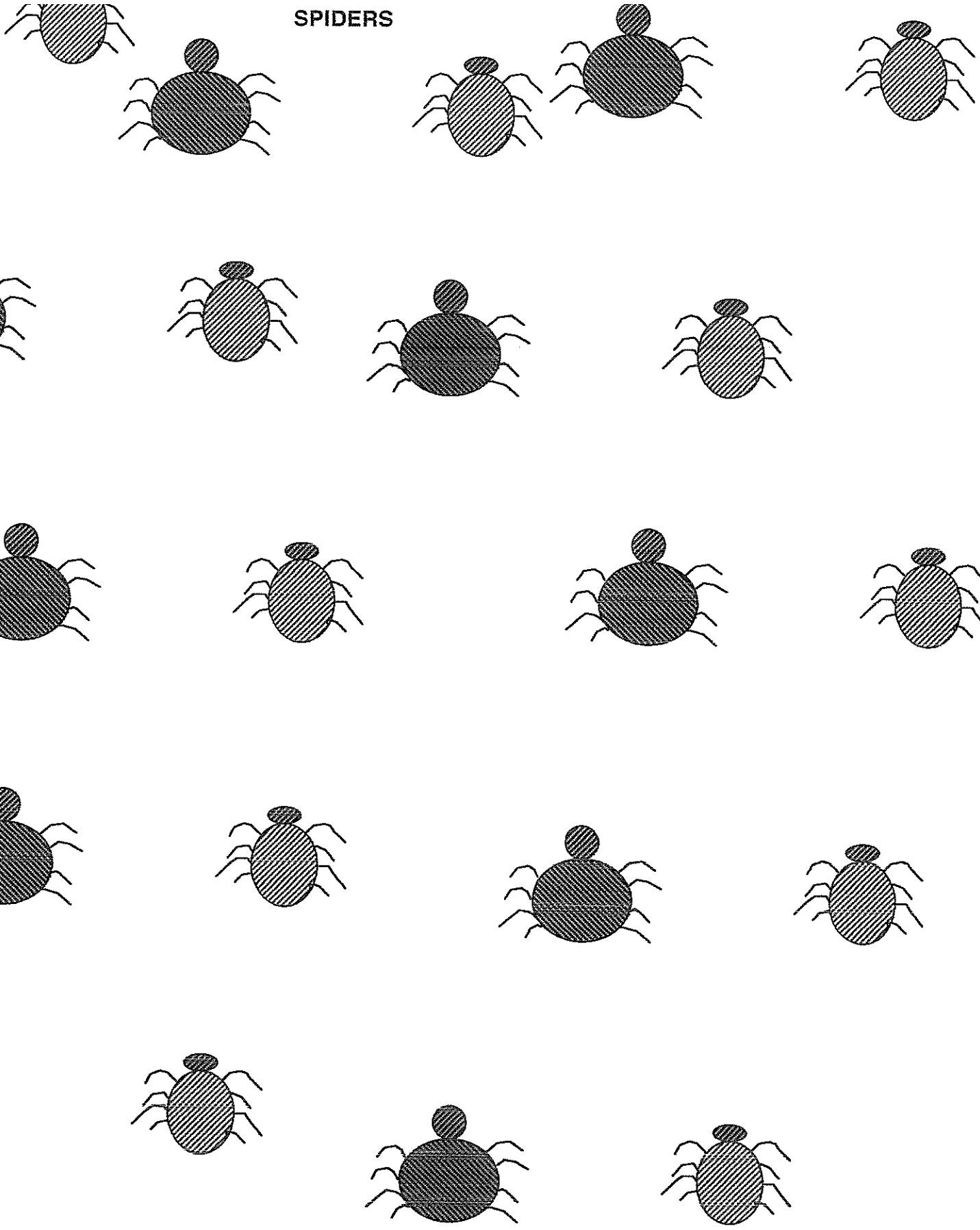
CLOSURE:
Have students use the insect and spider pictures to create a class story problem, have the problem changed each day by assigned groups.

EXTENSIONS:
What other animal could be used in story problems, brainstorm other story problems. Have students do a problem at home and share with the class.

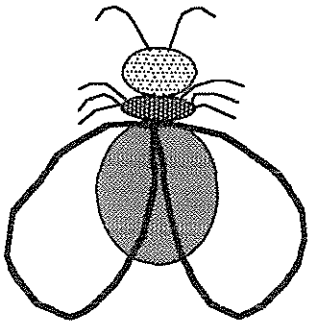
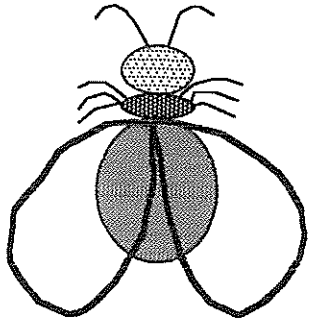
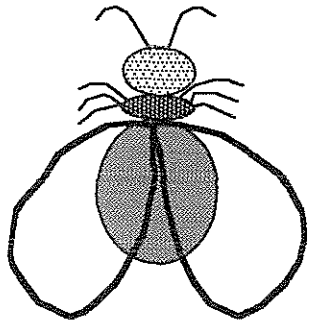
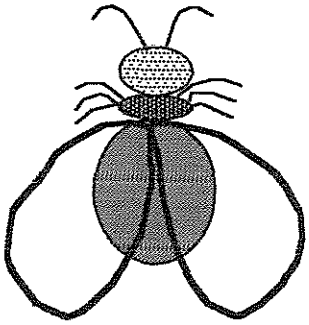
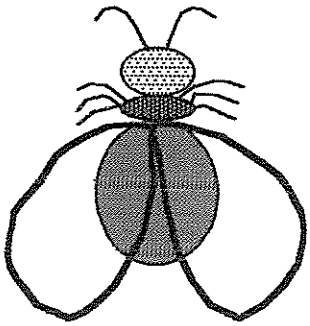
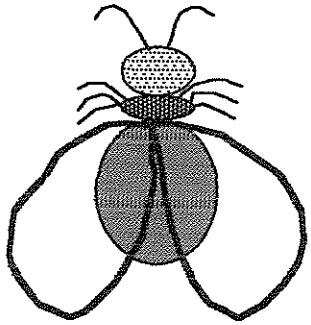
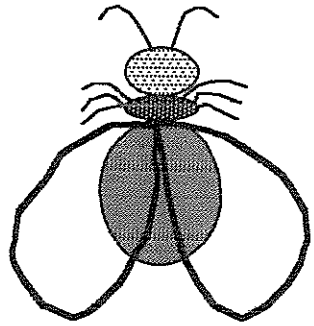
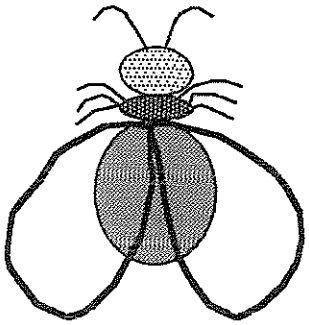
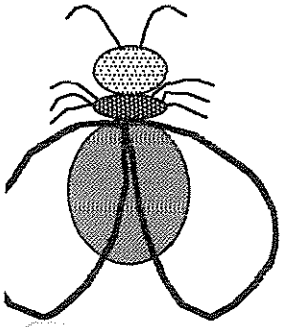
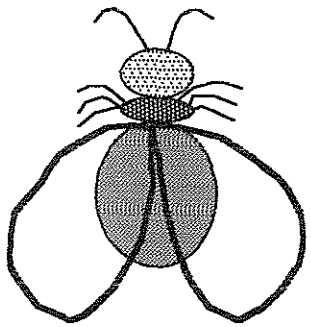
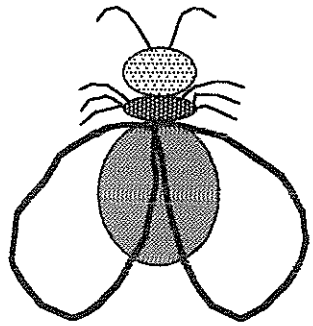
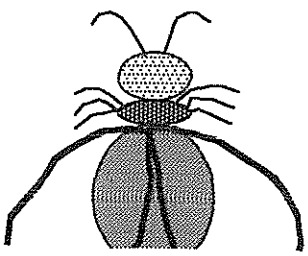
INSECTS



SPIDERS



WINGED INSECTS

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Fish Facts

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Striped Fish

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Classification

About Amphibians

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Common Frogs and Toads

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Identification

Fantastic Frogs Mini-Book (Part 1)

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