DOCUMENT RESUME

ED 412 080 SE 060 591

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TITLE Connections: Weather, Systems, and Resources. Unit Grade 4.
PUB DATE 1996-00-00
NOTE 24p.
AVAILABLE FROM Electronic version:
PUB TYPE Guides - Classroom - Teacher (052)
JOURNAL CIT http://www.bev.net/education/schools/ces/connect.html;
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academic Standards; Animals; Biology; Ecology; Environment; *Environmental Education; Grade 4; *Hands on Science; *Interdisciplinary Approach; Intermediate Grades; Lesson Plans; *Natural Resources; Plants (Botany); Science Activities; Teaching Guides; Writing Across the Curriculum
IDENTIFIERS Virginia

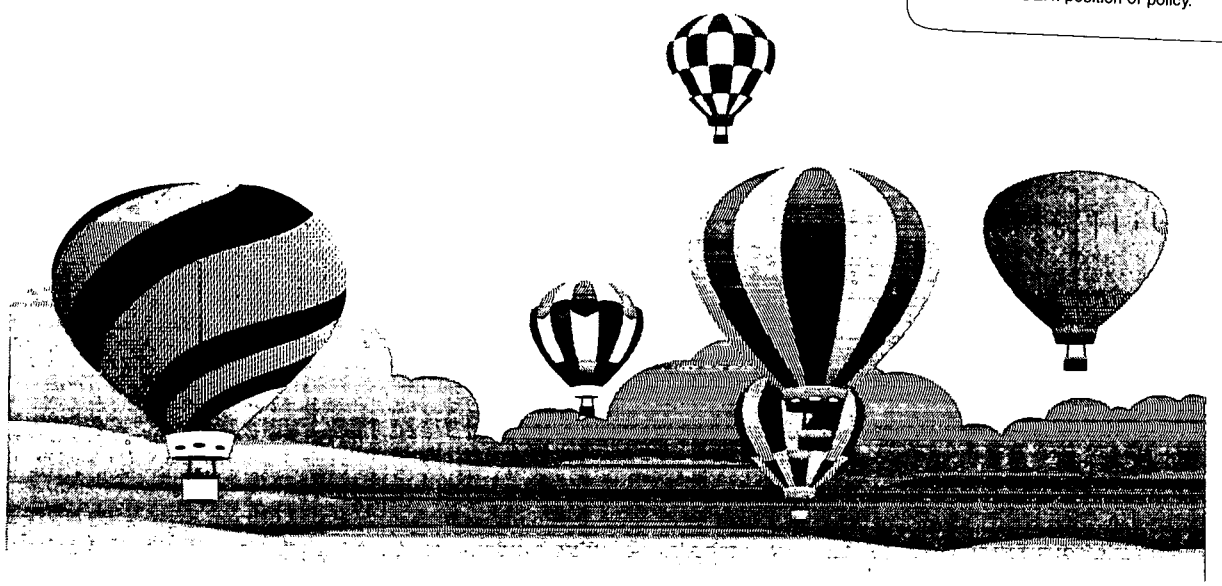
ABSTRACT

Natural Resources for Grade 4 is a "hands-on" environmental activities unit designed for teachers to use with their students. Activities are chosen from natural resource programs such as Project Learning Tree, Project WILD, Aquatic Wild, and Project WET. The activities address natural resource themes and meet the Virginia Standards of Learning for Grade 4. The 30 lessons contained within cover a number of topics including weather, plant anatomy, life processes, plants and animal in an ecosystem, and Virginia's natural resources. The lessons are interdisciplinary in their approach, meeting objectives from science, mathematics, oral language, reading, literature, writing, and research skills. (DDR)

Connections:

Weather, Systems & Resources Unit

Grade 4



"Meeting the SOLS Using Natural Resources"
Inspired by a Course at VA Tech College of Forestry and Wildlife, Summer 1996 (Kathy Sevebeck, Instructor)

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Natural Resources: Grade 4

Unit Description

Natural Resources is a "hands-on" environmental activities unit designed for teachers to use with their fourth-grade students. Activities were chosen from natural resource programs (Project Learning Tree, Project WILD, Aquatic Wild, and WET), UNITES program, and other sources for their ability to address natural resource themes, while meeting the Virginia Standards of Learning (SOL) for grade 4.

SOL

Science:

4.1 Plan and conduct investigations
4.2 Investigate & understand energy is needed to do work (machines)
4.4 Investigate & understand basic anatomy & life processes of plants
4.5 Study plant & animal ecosystems
4.6 Study weather condition & phenomena
4.8 Study Virginia natural resources

Math:

4.11 Estimate & measure weight/mass, and estimate conversion of ounces & grams
4.12 Estimate and measure length
4.13 Estimate and measure length using measuring devices
4.14 Use perimeter & find perimeter in standard & nonstandard units of measure
4.19 Collect, organize, and display data

English:

Oral Language
4.1 Use effective oral communication skills in a variety of settings
4.2 Make and listen to oral presentations and reports
Reading/Literature
4.4 Read fiction and nonfiction
4.5 Demonstrate comprehension of a variety of literary for
Writing
4.6 Read a variety of poetry
4.7 Write effective narratives and explanations
4.8 Edit final copies of writings
Research
4.9 Use information resources to research a topic

RESOURCES

Teacher Sources:

Naturescope: Weather, National Wildlife Federation
National Wildlife Federation
1400 Sixteenth Street, N.W.
Washington, DC. 20036-2266

Aims Activities: Primarily Plants

AIMS Education Foundation
P.O. Box 8120
Fresno, CA 93747-8120

UNITES: Using Literature to Unite the Curriculum V2 (Grades 3-5)
BEM Publishing, Inc.
707 Crestwood Drive
Blacksburg, VA 24060-6005

Project WILD (P/W)
Suzie Gilley
Department of Game and Inland Fisheries
P.O. Box 11104
Richmond, VA 23230

Project Aquatic WILD (A/W)
Suzie Gilley
Department of Game and Inland Fisheries
P.O. Box 11104
Richmond, VA 23230

Project WET
Ann Regn
Department of Environmental Quality
629 E. Main Street
Richmond, VA 23240

Related Poetry:
The Random House Book of Poetry for Children, Jack Prelutsky
Animals, Animals Eric Carle

Student Sources:
Weather Words, Gail Gibbons
Storms, Seymour Simon
Cloudy with a Chance of Meatballs. Judi Barrett
What Causes It? A Beginning Book About Weather, Jane Moncure
I Can Be a Weather Forecaster. Claire Martin
The Cloud Book, Tomie de Paola
A Seed is a Promise, Claire Merrill
The Tiny Seed, Eric Carle
Trees, Jonathan Pine
Be a Friend to Trees, Patricia Lauber
Red Leaf, Yellow Leaf, Lois Ehlert
The View from the Oak, Herbert and Judith Kohl
Animal Fact: Animal Fable, Seymour Simon

The Frog Prince, Mark Teague
The Desert is Theirs, Byrd Baylor
Owl Moon, Jane Yolen
Owl at Home, Arnold Lobel
The Way Things Work, David Macauley
Mother Goose, Cyril Richard, Celeste Holm, and Boris Karloff
Where Do You Think You Are Going, Christopher Columbus? Jean Fritz
The First Dog, Jan Brett
Just a Dream, Chris Van Allsburg
Fish Calendar, Siegfried Schmitz
Heron Street, Ann Turner

Students read:

Owls in the Family, Farley Mowat (25 copies)
Where the River Begins, Thomas Locker (25 copies)
Paddle to the Sea, Holling Clancy Holling (25 copies)
A River Ran Wild, Lynne Cherry (25 copies)
The Aesop for Children, Milo Winter (25 copies)

List of Activities in the Unit:

"Thunderstorm" *Project WET* p. 196
"The Weather Master Myth" *NatureScope: Wild About Weather* p. 7
"Stormy Weather" *Project WILD* p. 26
"Poetic Precipitation" *Project WET* p. 182
"The Pressure Is On" *NatureScope: Wild About Weather* p. 11
"Follow the Front" *NatureScope Wild About Weather* p. 21
"Cloud Chart" *NatureScope Wild About Weather* pp. 32, 33
"Seed Need" *Project WILD* p. 78
"Inside a Seed", "Seed Grows", "It's in a Bag" *Aims: Primarily Plants* pp. 2-15
"Adopt a Tree" PLT p. 66
"Air Plants" *PLT* p. 85
"Bursting Buds" *PLT* p. 232
"Planet of Plenty" *PLT* p. 24
"Water Address" *Project WET* p. 122
"Can It Be Real" *PLT* p. 30
"Quick Frozen Critters" *Project WILD* p. 122
"Grasshopper Gravity" *Project WILD* p. 16
"Designing a Habitat" *Project A/W* p. 20
"Owl Pellets" *Project WILD* p. 144
"Deadly Links" *Project WILD* p. 270
"Humpty Dumpty" *Project WET* p. 316
"Energetic Water" *Project WET* p. 242
"Branching Out" *Project WET* p. 129
"Rainy Day Hike" *Project WET* p. 186
"Sum of the Parts" *Project WET* p. 267
"Who Lives Here" *Project WILD* p. 174

"Animal Charades" *Project WILD* p. 4
"Dragonfly Pond" *Project Aquatic WILD* p. 154
"Fishy Who's Who" *Project Aquatic WILD* p.86
"Environmental Exchange Box" *Project WET* p.61

Suggested List of Additional Activities (not in Unit):

"Paddle to the Sea" *UNITES V2 (4) p. 46*
"Where the River Begins" *UNITES V2 (4) p.* 58
"A River Ran Wild" *UNITES V2 (5) p. 122*
"Joyful Noise" *UNITES V2 (4) p. 84*
"Ben and Me" *UNITES V2 (4) p. 44*
"Dear Mr. Henshaw" *UNITES V2 (4) p. 50*
"Flight" *UNITES V2 (4) p. 60*
"The Lion, the Witch and the Wardrobe" *UNITES V2 (4) p.* 54
"Magic School Bus: Lost in the Solar System" *UNITES V2 (4) p.*56
"Charlie and the Great Glass Elevator" *UNITES V2 (4) p.*48
"Thirsty Plants" *Project WET p. 116*
"Microtrek Treasure Hunt" *Project WILD p. 22*
"Where are the Frogs" *Project WET p. 279*
"Piece It Together" *Project WET p.174*
"School yard Safari" *PLT p. 46*
"Common Water" *Project WET p. 232*

Lesson 1: Weather

"Thunderstorm" *Project WET* p. 196

Objective: Students will work cooperatively to mimic the sounds of a thunderstorm, become aware of the sounds of a thunderstorm, and monitor precipitation

Materials: Tin can, ruler, pencil, portfolio, drawing paper

Procedures:

1. Simulate sounds of a thunderstorm
2. Read *Weather Words,* Gail Gibbons
3. Create sounds of a thunderstorm
4. Build a rain gauge (tin can, ruler)

Evaluation: Draw or write stories about thunderstorms, and measure and record precipitation using constructed rain gauges.

SOL

Science: 4.1 Plan and conduct investigations
4.6 Study weather condition & phenomena
Math: 4.11 Estimate and measure length
English: Reading/Literature
4.3 Read and learn the meaning of unfamiliar words
4.7 Write effective narratives and explanations

Lesson 2: Weather

"The Weather Master Myth" *NatureScope: Wild About Weather* p. 7

Objective: Students will describe how the Earth, sun, water, and air affect weather and investigate the characteristics of a tall tale and myth.

Materials: copies of *American Tall Tales* and *NatureScope* p. 7, pencil, paper

Procedures:

1. Describe how the Earth, sun, water, and air affect weather
2. Read *American Tall Tales,* Mary Pope Osborne
   a. Read "Sall Ann Thunder Ann Whirlwind" p. 15
   b. Discuss the characteristics of a tall tale
3. Read aloud the myth "The Weather Master"*NatureScope: Wild About Weather* p. 7

Evaluation: Write a weather myth or tall tale after listening to several

SOL

Science: 4.1 Plan and conduct investigations
4.6 Study weather condition & phenomena
4.7 Study relationship among Earth, moon & sun

English: Reading/Literature
4.5 Demonstrate comprehension of a variety of literary forms

Lesson 3: Weather

"Stormy Weather" *Project WILD* p. 26

Objective: Students will investigate and understand weather phenomena; and understand humans and wildlife share a common environment, and experience some of the same natural phenomena

Materials: Drawing paper

Procedures:

1. Read the poem "Rainstorms" and chant and clap to the rhythm of the poem
2. Share weather experiences
3. Read *Cloudy with a Chance of Meatballs*, Judi Barrett (fiction)
4. Read *Storms,* Seymour Simon (nonfiction)
5. Compare *Storms,* Seymour Simon (nonfiction) with *Cloudy with a Chance of Meatballs,* Judi Barrett (fiction)
   - Write your own version "Cloudy with a Chance of _____"
6. Simulate a field trip
   a. Read aloud *Project WILD* p. 26, 27
   b. Discuss the concept that many animal (including people, pest, wildlife) share a common environment
   c. Describe the experience
   d. Draw mental pictures
   e. Pantomime animal actions during the story

Evaluation: Write a natural-phenomena story (drought, snowstorm, food, tornado, fire, earthquake) from either a child or wild animal's point of view

SOL

Science: 4.1 Plan and conduct investigations
4.6 Study weather condition & phenomena
English/Oral Language: 4.1 Contribute to group discussion
Reading/Literature: 4.4 Read fiction and nonfiction
Writing: 4.6 Read a variety of poetry
4.7 Write effective narratives and explanations

Lesson 4: Weather

"Poetic Precipitation" *Project WET* p. 182

Objective: Students will investigate and understand characteristics of rain, recognize how rain clouds are formed, and recognize that thoughts and feelings are influenced by weather conditions.

Materials: journal, balloons (½ of class), garbage bags, samples of rain poems and songs

Procedures:

1. Explore characteristics of rain
2. Read *The Random House Book of Poetry for Children,* Jack Prelutsky ("Rain Clouds" p. 30, "Rain Has Silver Sandals" p. 29, "To Walk in Warm Rain" p. 30)

Evaluation: Evaluate students abilities to accurate simulate rain clouds

SOL

Science: 4.1 Plan and conduct investigations
4.6 Study weather condition & phenomena
English: Reading/Literature
4.6 Read a variety of poetry
4.7 Write rhymed, unrhymed, and patterned poetry

Lesson 5: Weather Experiment

"The Pressure Is On" *NatureScope: Wild About Weather* p. 11

Objective: Students will investigate and understand how weather conditions occur.

Materials: Experimental Lab Sheet, yardstick, balloons, yardsticks, string, pin, books

Procedures:

1. Explore that air has weight and moves form an area or higher to lower pressure
2. Read *What Causes It? A Beginning Book About Weather,* Jane Moncure
3. Experiment # 1:
   a. Make a yardstick balance
   b. Why does the balance tip when one balloon is deflated? (deflated balloon weighs less than inflated one)
4. Experiment # 2:
   a. Fill balloons with air
   b. Release them outdoors
   c. Why did the balloons zip away? (air moves from an area of higher to lower pressure)

Evaluation: Assess student abilities recording results accurate on Experimental Lab sheets

SOL

Science: 4.1 Plan and conduct investigations
4.6 Study weather condition & phenomena
Math: 4.12 Estimate and measure length measuring devices
English/Writing: 4.7 Write effective narratives and explanations
4.8 Edit final copies of writing

Lesson 6: Weather

"Follow the Front" *NatureScope: Wild About Weather* p. 21

Objective: Students will explain what a front is and define the terms warm front and cold front.

Materials: Copy *NatureScope: Wild About Weather* p. 25, scissors, blue crayons, tape, tagboard

Procedures:

1. Make a paper model of a warm front and a cold front
2. Read *I Can Be a Weather Forecaster,* Claire Martin
3. Explain what a front is (*NatureScope: Wild About Weather* p.16, 17)
   a. Make "front viewers" (Copy *NatureScope: Wild About Weather* p. 25)
   b. Discuss how warm and cold fronts are formed

Evaluation Check student records of what happens "front wise" each day (newspaper, Internet, and other media sources)

SOL

Science: 4.1 Plan and conduct investigations
4.6 Study weather condition & phenomena
English/Oral Language: 4.1 Use effective oral communication skills

Lesson 7: Weather

"Cloud Chart" *NatureScope: Wild About Weather* (Insert between pp. 32 and 33)

Objective Students will investigate and identify different types of clouds

Materials: Copy *NatureScope: Wild About Weather* (Insert between pp. 32 and 33), blue bulletin-board paper, pencils, crayons, markers, yardsticks

Procedures:

1 Read *The Cloud Book,* Tomie de Paola
   a. Observe clouds in the sky
   b. Write your observations
2. Design a cloud chart
   a. Discuss the characteristics of clouds (cumulus=puffy, bulgy clouds, stratus=low, gray clouds, cirrus=high wispy clouds)
   b. Use the insert (*NatureScope: Wild About Weather* between pp. 32 and 33) to build a cloud chart
3. Share cloud charts with the class

Evaluation: Assess accuracy of student cloud charts

SOL

Science: 4.1 Plan and conduct investigations
4.6 Study weather condition & phenomena
Math: 4.12 Estimate and measure length using actual measuring devices

4.19 Collect, organize, and display data in line and bar graphs

English: Oral Language: 4.1 Use effective oral communications skills
4.2 Make and listen to oral presentations

Writing: 4.7 Write effective narrative and explanations

Lesson 8: Plant Anatomy & Life Processes

"Seed Need" *Project WILD* p. 78

Objective: Students will be able to explain how seeds are carried by animals, investigate and understand how through seed dispersal wildlife contribute to a health ecological system.

Materials: Fuzzy sock, tape, magnifying glasses, clear cups, graph paper, drawing paper

Procedures:

1. Explore how seeds are dispersed
2. Read *A Seed is a Promise,* Claire Merrill
3. Gather seeds by going outside and wearing old socks over shoes
   a. Carefully remove socks
   b. Examine the seeds with a hand lens
   c. Chart the seeds on graph paper
   d. Try growing the seeds in a cup
4. Draw pictures of seeds that are transported by animals and identify the part of the seed that makes this possible

Evaluation: Assess student abilities to explain in story form "How Seeds Scatter and Grow"

SOL

Science: 4.1 Plan and conduct investigations
4.4 Investigate & understand basic anatomy & life processes of plants

English: Oral Language: 4.1 Contribute to group discussions

Reading/Literature: 4.4 Read fiction and nonfiction

Writing: 4.7 Write effective narratives and explanations

Math: 4.19 Collect, organize, and display data on graphs

Lesson 9: Plant Anatomy & Life Processes

"Inside a Seed", "Seed Grows", "It's in a Bag" *Aims Activities: Primarily Plants* pp. 2-15

Objective: Students will plant seeds and observe and understand how they grow and what they look like

Materials: Copy selected pages from *Aims Activities: Primarily Plants* pp. 2-15, bean seeds, plastic sandwich bags, portfolio

Procedures:

1. Observe the structures of a typical plant
2. Read *The Tiny Seed,* Eric Carle
3. Look inside a bean seed

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4. Soak the bean seed overnight
5. Place it in a plastic bag and watch it grow
6. Record the growth of the bean seed on a graph
7. Write a story titled "The Bean Seed" and describe how it grew (root, stem, leaves, and flower)

Evaluation: Assess student stories on how well they explained germination

SOL

Science: 4.1 Plan and conduct investigations
4.4 Investigate basic anatomy & life processes of plants
Math: 4.19 Collect, organize, and display data on graphs
English: Reading/Literature:
4.4 Read fiction and nonfiction
4.7 Write effective narratives and explanations

Lesson 10: Plant Anatomy & Life Processes

"Adopt a Tree" PLT p. 66

Objective: Students will investigate and describe through observation a chosen tree and organize information about it

Materials: Drawing paper, copy of PLT p. 68, centimeter tapes

Procedures:

1. Investigate the structure of a tree
2. Read *Trees*, Jonathan Pine
3. Choose a tree
3. Describe the tree using your senses
4. Work in pairs: measure its height, circumference, and crown
5. Create a picture of a flip-up tree

Evaluation: Assess student abilities by examining essays about the life of a tree from the tree's perspective

SOL

Science: 4.1 Plan and conduct investigations
4.4 Investigate basic anatomy & processes of plants
Math: 4.12 Estimate and measure length using actual measuring devices
English: Oral Language: 4.2 Make and listen to oral presentations and reports
Writing: 4.7 Write effective narratives and explanations
Research: 4.9 Use information resources to research a topic

Lesson 11: Plant Anatomy & Life Processes

"Air Plants" *PLT* p. 85

Objective: Students will demonstrate and describe the process of photosynthesis; and investigate and understand how humans depend on photosynthesis for survival.

Materials: Activity sheet *PLT* p. 87, large ball of string

1. Discuss how plants are different from people (make their own food=photosynthesis)

2. Read *Be a Friend to Trees*, Patricia Lauber
3. Perform experiment
   a. Give each child a 20-foot string (5 foot, each side) and make a square
   b. Arrange squares into a grid
   c. Share that plots in grid represent area needed by group for one day's oxygen supply

Evaluation: Assess student completion of activity sheet *(PLT* p. 87) and oral presentation of information on sheet.

SOL

Science: 4.1 Plan and conduct investigations
4.4 Investigate basic anatomy & life processes of plants
Math: 4.12 Estimate & measure length
English/Oral Language: 4.1 Contribute to group discussions & support opinions
Reading/Literature: 4.4 Read fiction and nonfiction

Lesson 12: Plant Anatomy & Life Processes

"Bursting Buds" *PLT* p. 232

Objective: Students will investigate and understand the purpose of a tree's buds, and describe where leaves come from and how they form.

Materials: drawing paper, notebooks

Procedures:

1. Observe the size and structure of a plant as an adaptation to its habitat
2. Read *Red Leaf, Yellow Leaf*, Lois Ehlert
3. Observe a tree or shrub every few months throughout the year
   a. Ask students where will new leaves come from? (buds)
   b. Describe how leaves are formed
   c. Measure the growth of leaves

Evaluation: Record observations throughout the year, and write a description of how buds change into leaves

SOL

Science: 4.1 Plan and conduct investigations
4.4 Investigate basic anatomy & life processes of plants
Math: 4.12 Estimate and measure length using measuring devices
English/Writing: 4.7 Write effective narratives and explanations

Lesson 13: Plants and Animals in an Ecosystem

"Planet of Plenty" *PLT* p. 24

Objective: Students will investigate the diversity of life on Earth and understand its importance

Materials: Measuring tape, clipboard, pencils, writing paper, string, magnifiers, poster board

Procedure:

1. Explore an ecosystem made up of plants and animals
2. Read *The View from the Oak*, Herbert and Judith Kohl
3. Part A: "Mission to Planet Earth"

a. Pretend students are scientists from planet Devoid studying life on Earth
b. Plot, study, record, describe, and classify all life forms on Earth
c. Work in teams

4. Part B: "Diversity Data"
   a. Mark boundaries of observation area (20-foot square)
   b. Predict the types of life forms
   c. Examine and record data from their area
5. Part C: "Back on Devoid"
   a. Present findings from each team
   b. Take notes on other team findings
   c. Draw conclusions about the number and kind of plants and animals found

Evaluation:

1. Write a letter to a pen pal to another planet describing what you found on Earth
2. Assess data collection, clarity of presentations, and accuracy of conclusions

SOL

Science: 4.1 Plan and conduct investigations
4.5 Study plant & animal ecosystems
Math: 4.12 Estimate and measure length
English: Oral Language: 4.1 Contribute to group discussions, and support opinions
4.2 Make and listen to oral presentations
Reading/Literature: 4.4 Read fiction and nonfiction
Writing: 4.7 Write effective narratives and explanations

Lesson 14: Plants and Animals in an Ecosystem

"Water Address" *Project WET* p. 122

Objective: Students will recognizee water-related adaptations of some plants and animals

Materials: Copy Water Address Cards *Project WET* p. 124-125, pencils, paper, world map, encyclopedia, 3"x 5" index cards

Procedure:

1. Identify plant and animal adaptations and their habitats by analyzing clues
2. Read *The Desert is Theirs*, Byrd Baylor
   a. List the plants and animals in this desert book
   b. Compare plant and animal adaptations in the desert to the Arctic, aquatic, temperate, or rain forest habitat
   c. Write about a different habitat titled "The _____ is Theirs"
3. Play riddle game "Water Address"
   a. Hand out a set of Water Address Cards to each group
   b. Pick one member of the group as a "reader"
   c. Assign points according to the number of clues read before the name of the organism and its water address is guessed (i.e., 1 clue= 4 points, 2 clues= 3 points, 3 clues=2 points, and all 4 clues=1 point)
   d. Continue the game until all the cards have been read

Evaluation:

1. Identify an organism and its environment based on a set of clues

2. Create and write clues for a different organism
3. Evaluate written descriptions of a different habitat

SOL

Science: 4.1 Plan and conduct investigations
4.5 Study plant & animal ecosystems
Math: 4.19 Collect, organize, and display data
English: Oral Language: 4.1 Use effective oral communication skills
Reading/Literature: 4.4 Read fiction and nonfiction
4.5 Demonstrate comprehension of a variety of literary forms
Writing: 4.7 Write effective narratives and explanations
4.9 Use information resources to research a topic

Lesson 15: Plants and Animals in an Ecosystem

"Can It Be Real" *PLT* p. 30

Objective: Student will investigate unusual plants and animals and describe their adaptations to environments

Materials: Copy *PLT* pp. 33 & 34, pencils, research Internet, CD-ROMs, books for unusual plants and animals, poster board, markers

Procedures:

1. Investigate extraordinary plants and animals to gain insight into adaptations to ecosystems
2. Read *The Frog Prince,* Mark Teague
   a. Ask if the story could be real
   b. Write why you think the story is real (fact) or unreal (fiction).
3. Part A: "Stranger Than Fiction"
   a. Pass out copies of fictitious plants and animals *PLT* p. 33
   b. Choose whether the animal or plant is "real" or "fictitious" based on descriptions
   c. Identify all the plants and animals as "real"
4. Part B: "The Adaptables"
   a. Discover the unique adaptations (*PLT* p. 34 "Amazing Animals & Plants")
   b. Create a poster describing their animal
   c. Present posters to the class

Evaluation: Assess presentations of posters for clarity of understanding the relationship between species adaptations and the environment

SOL

Science: 4.1 Plan and conduct investigations
4.5 Study plant & animal ecosystems
Math: 4.19 Collect, organize, and display data
English: Oral Language: 4.1 Use effective communication skills
4.2 Make and listen to oral presentations and reports
Reading/Literature: 4.4 Read fiction and nonfiction
4.9 Use information resources to research a topic

Lesson 16: Plants and Animals in an Ecosystem 14

"Quick Frozen Critters" *Project WILD* p. 122

Objective: Students will investigate and understand the importance of adaptations in predator/prey relationships

Materials: food tokens (pennies), arm bands, 4-5 hula hoops, pencil, paper

Procedures:

1 Read *Animal Fact: Animal Fable,* Seymour Simon
2. Play a version of "freeze tag"
   a. Select students as either "predators" (one predator per four prey) or "prey"
   b. Identify one end of a playing field or gym the "food source" and the other end the "shelter'
   c. Place 4-5 hula hoops as additional shelter in the space between the ends
   d Prey start rounds by moving from their "shelter" to the "food source" to collect one token (penny) each round
   e. Prey may "freeze" or find "shelter" to avoid being caught
   f. Predators must capture two prey by removing their arm bands

Evaluation: Discuss effective ways prey avoided capture and compare them to animals in the wild

SOL

Science: 4.1 Plan and conduct investigations
4.5 Study plant & animal ecosystems
English: Oral Language: 4.1 Use effective communication skills
4.4 Read fiction and nonfiction

Lesson 17: Plants and Animals in an Ecosystem

"Grasshopper Gravity" *Project WILD* p. 16

Objective: Students will observe live grasshoppers and investigate relationships between structure and function, recognize wildlife occurs in a variety of size and forms, and understand the responsibility and power of humans regarding animals

Materials: Copy "Grasshoppers" *Project WILD* p. 17, tennis-ball collection containers, magnifiers, pencil

Procedures:

1. Observe, handle and describe live grasshoppers or crickets
2. Read several of Aesop's fables, including "The Ass and the Grasshopper"*The Aesop for Children,* Milo Winter p. 56
   a. Discuss the lesson in the story, "The laws of nature are unchangeable"
   b. After reading several, write your own fable
3. In fall, collect one grasshopper for every two students
   a. Use tennis-ball containers
   b. Carefully observe the grasshoppers without harming them
   c. Answer the question sheet titled "Grasshoppers" *Project WILD* p. 17

Evaluation: Discuss how grasshoppers fit into the ecosystem (What do they eat? What eats them?)

SOL

Science: 4.5 Investigate & understand how plants & animals ecosystems interact

Math: 4.19 Collect, organize, and display data
English: Oral Language: 4.1 Use effective communication skills
4.4 Read fiction and nonfiction
Writing: 4.7 Write effective narratives and explanations

Lesson 18: Plants and Animals in an Ecosystem

"Designing a Habitat" *Project A/W* p. 20

Objective: Students will investigate and understand the components of a habitat that is suitable for the survival of most aquatic animals

Materials: 3x5 cards, modeling clay, 1"square graph paper, popsicle sticks, Easter grass, cotton balls

Procedures:

1. Design a habitat suitable for aquatic wildlife to survive in a zoo
2. Read *Owls in the Family*, Farley Mowat
   a. Design a habitat for the two owls
   b. Discuss the pros and cons of keeping wild animals in captivity
3. Procedure:
   a. Prepare animal cards
   b. Research (in teams of two to four) their animals using Internet (Check out TechnoZoo "http://www.bev.net/education/schools/ces/", CD-ROMs, library books
   c. Design and build a model of a zoo exhibit on 1"square graph paper
   d. Summarize components of each habitat (food, water, shelter, and space)

Evaluation:

1. Assess the 3D model for accuracy
2. Test the components of a suitable habitat to insure that survival needs were met

SOL

Science: 4.1 Plan and conduct investigations
4.5 Study plant & animal ecosystems
Math: 4.12 Estimate and measure length
4.14 Use perimeter and find the perimeter in both standard and nonstandard units of measure
4.19 Collect, organize, and display data
English: Oral Language: 4.1 Use effective oral communication skills
4.2 Make and listen to oral presentations and reports
Reading/Literature: 4.4 Read fiction and nonfiction
Research: 4.9 Use information resources to research a topic

Lesson 19: Plants and Animals in an Ecosystem

"Owl Pellets" *Project WILD* p. 144

Objective: Students will be able to construct a food chain

Materials: Copy key, owl pellets, tweezers, tape, large pieces of tagboard, "A Home for Pearl" video

Procedures:

1. Examine owl pellets in order to construct a simple food chain
2. Read *Owl Moon,* Jane Yolen

a. Render the text by writing phrases from the book on the chalkboard
b. Write your own "Owl" story or poem

3. Purchase owl pellets from biological supply or wildlife refuge
4. Activity:
   a. Divide students into groups of two to four
   b. Separate the bones from the fur and feathers
   c. Examine, identify, and label the bone structures using a key
5. Draw a food chain that includes the owl (e.g., owl, field mouse, grasshopper, seeds, sun)
6. View "A Home for Pearl" (3-15 to 20 minute segments on wildlife)

Evaluation: Assess student food chains for accuracy

SOL

Science: 4.1 Plan and conduct investigations
4.5 Study plant & animal ecosystems

English: Reading/Literature
4.4 Read fiction and nonfiction
4.6 Read a variety of poetry
Writing: 4.7 Write effective narratives
Research: 4.9 Use information resource to research a topic

Lesson 20: Plants and Animals in an Ecosystem

"Deadly Links" *Project WILD* p. 270

Objective: Students will understand how pesticides can enter and possibly harm food chains

Materials: Plastic grocery bags, colored arm bands (2 red, 6 green, 18 white)

Procedures:

1. Investigate ways pesticides enter a food web
2. Read the ridiculous stories of *Owl at Home,* Arnold Lobel
   -Write your own funny story about an owl
3. Substitute food chain for an owl, field mice, grasshopper and wheat seeds
4. Procedure:
   a. Divide students into three groups: 3X as many field mice as owls, and 3X as many grasshoppers as field mice (e.g., 26 students= 18 grasshoppers, 6 field mice, and 2 owls)
   b. Hand each grasshopper a plastic bag (stomach)
   c. Distribute multi-colored square pieces of paper over an open space (field, gym, or classroom)
   d. Take turns collecting food: First grasshoppers gather square pieces; then field mice gather grasshoppers (stomach bags); and finally owls collect bags (stomach bags) from the field mice
5. Examine the contents of the owls' bags
   a. list contaminants (pesticides) in the food chain (i.e., multi-colored square pieces)
   b. Record the number of pesticides in the food chain
   c. Write how the pesticides got into the food chain using a cumulative tale such

as "This is the House That Jack Built" (e.g. This is the habitat where Owl lives; these are the field mice that Owl eats; these are the field mice who eat the grasshoppers who ate the grain that live in the habitat where Owl lives; this is Owl who eats the field mice who ate the grasshoppers who ate the polluted grain in the habitat where Owl used to live...)

Evaluation: Give three examples of ways in which pesticides could enter a food chain and discuss two possible consequences

SOL

Science: 4.1 Plan and conduct investigations
4.5 Study plant & animal ecosystems

English: Reading/Literature
4.4 Read fiction and nonfiction
Writing: 4.7 Write effective narratives and explanations

Lesson 21: Plants and Animals in an Ecosystem

"Humpty Dumpty" *Project WET* p. 316

Objective: Students will investigate and understand the challenges of restoring an altered natural environment, and simulate a restoration process by putting an ecosystem back together again

Materials: Copy of the puzzle pattern *Project WET* p. 321, old magazines, glue, scissors, tagboard, objects with multiple parts

Procedures:

1. Read the *Mother Goose,* Cyril Richard, Celeste Holm, and Boris Karloff, nursery rhyme "Humpty Dumpty"
   -Discuss how Humpty Dumpty would look if he was put back together again
2. Make a nature scene puzzle
   a Distribute copy of the puzzle pattern *Project WET* p. 321
   b. Glue the pattern onto tagboard and cut around the circle
   c. Cut out nature scenes from magazines and glue it to the other side of the tagboard
   d. Put the puzzles back together again
3. Disassemble and reassemble discarded items (spring-loaded pens, clock, radio, toy, fry pan)
4. Compare restoration in real-life to the puzzle and other items they reassembled

SOL

Science: 4.1 Plan and conduct investigations
4.2 Investigate & understand energy is needed to do work (machines)
4.5 Study plant & animal ecosystems
Math: 4.2 Solve problems involving pattern identification & completion of patterns

English: Oral Language: 4.1 Use effective oral communication skills
Reading/Literature: 4.4 Read fiction and nonfiction

Lesson 22 : Simple Machines

"Energetic Water" *Project WET* p. 242

Objective: Students will investigate and understand how water can be used to do work

Materials: Wood blocks, coarse sandpaper, glue, masking tape, paper cups, Styrofoam pieces, pipe cleaners, plastic spoons, plastic straws, scissors, corks, cardboard, string, tongue depressors

Procedures:

1. Design devices to make water do work
2. Explore the wheel and axle at work with *The Way Things Work,* David Macauley pp. 36, 37 (also CD-ROM)
3. Discuss how moving water changes from potential to kinetic energy to do work (e.g., grind grain, tell time, lift ships, operate cars, train, and ships)
4. Share "Water Through Time" time line *Project WET* p. 245
5. Build a machine that shows how the energy generated by water can do work:
   a. Give each team a "Student Invention Kit"
   b. Allow teams time to complete projects
   c. Demonstrate team solutions to the problem

Evaluation:

1. Write a description of how your machine works
2. Identify what energy form was used and what work was done
3. Assess models for design accuracy

SOL

Science:	4.1 Plan and conduct investigations
	4.2 Investigate & understand energy is needed to do work (machines)
English: Oral Language:	4.1 Use effective oral communication skills
	4.2 Make and listen to oral presentations
Reading/Literature:	4.4 Read fiction and nonfiction
	4.7 Write effective narratives

Lesson 23: Virginia's Natural Resources

"Branching Out" *Project WET* p. 129

Objective: Students will construct a watershed model to investigate and understand how water flows in watershed and drainage patterns

Materials: Make a transparency of "Branching Patterns"*Project WET* p. 132, spay bottles, blue-colored water, drawing paper, pencil, blue pencils, tracing paper, maps of local rivers

Procedures:

1. Read *Where the River Begins.* Thomas Locker
   -Do the activity "Where the River Begins" *UNITES* V2 (4), p. 58
   a. Map the river in the story
   b. Map a local river (e.g., New River) from its source to its mouth
   c. After reading the story, use your senses to write about a trip along a river
2. Build a model of a watershed:
   a. Wrap rocks with white paper and lay them in a aluminum pan
   b. Sketch "high" and "low" spots

c. Spray blue-colored water over the model and note where it flows
d. Mark the actual branching patterns with blue pencil
e. Determine if smaller watersheds overflow into larger ones (Is there one place or more than one place water collects?)

3. Compare drawings with pictures in *Where the River Begins*

Evaluation:

1. Compare drainage pattern of watersheds to other branching networks
2. Write a story or draw a map of drainage patterns in your watershed

SOL

Science: 4.1 Plan and conduct investigations
4.8 Study Virginia natural resources
Math: 4.19 Collect, organize, and display data
English: Oral Language: 4.1 Use effective oral communication skills
Reading/Literature: 4.4 Read fiction and nonfiction
Writing: 4.7 Write effective narratives

Lesson 24: Virginia's Natural Resources

"Rainy Day Hike" *Project WET* p. 186

Objective: Students will investigate and understand the concepts of watersheds, and identify how water flows over the school grounds

Materials: Maps of local community, showing streams, lakes, and topography, drawing paper, copy the Legend *Project WET* p. 190 (2 sets), rain gear, clip boards with paper, plastic wrap, pencils

Procedures:

1. Introduce students to the concept of watersheds by collecting data about water flowing over the school grounds
2. Read *Paddle to the Sea,* Holling Clancy Holling
   -Do activity "Paddle to the Sea" *UNITES* V2 (4), p. 47
   a. Keep a diary of Paddle's trip to the sea
   b. Diagram the tributaries (river branches) Paddle took on his way to the sea
3. Part I:
   a. Create a map of the school grounds (divide the grounds into sections and assign groups to map each area)
   b. Predict where water flows onto the school grounds
4. Part II:
   a. Tour the school grounds on a rainy day
   b. Compare predictions with actual flow of water on the school grounds
5. Extension: Measure the slope gradient
6. Have Paddle boat races down the slopes

Evaluation:

1. List ways the school grounds positively affect water passing through the watershed
2. Locate sources of point and non-point source pollution on the school grounds

SOL Science: 4.1 Plan and conduct investigations
4.8 Study Virginia natural resources

Math: 4.12 Estimate and measure length
English: Reading/Literature
4.4 Read fiction and nonfiction
4.5 Demonstrate comprehension of a variety of literary forms

Lesson 25: Virginia's Natural Resources
"Sum of the Parts" *Project WET* p. 267
Objective: Students will recognize everyone is responsible for a river's water quality
Materials: White bulletin-board paper, drawing pencils or markers, pencil, scissors
Procedures:
1. Read *A River Ran Wild,* Lynne Cherry
   -Do the activity "A River Ran Wild" *UNITES* V2 (5), p. 123
   a. Represent "polluter" or "filterers"
   b. Write captions explaining the degradation and restoration of the river on a time line
2. Activity:
   a. Pass out "pieces" (use *Project WET* p. 267 to label) of property along a stream
   b. Draw how you would use your property, if given a million dollars
   c. Put the puzzle "pieces" together to form a stream

Evaluation:
1. Assess student abilities to transfer this process to a lake system
2. Once puzzle pieces are put together, discuss individual contributions to total water quality
3. Write a paragraph identifying what students can do to protect water quality

SOL
Science: 4.1 Plan and conduct investigations
4.8 Study Virginia natural resources
Math: 4.1 Identify, orally and in writing, place value of digits
English: Oral Language: 4.1 Use effective oral communication skills
Reading/Literature: 4.4 Read fiction and nonfiction
Writing: Write effective narrative and explanations

Lesson 26: Virginia's Natural Resources
"Who Lives Here" *Project WILD* p. 174
Objective: Students will identify some native and non-native animal inhabitants of Virginia
Materials: Research materials (CD-ROM, Internet, library books), writing materials, pencils
Procedures:
1. Read *Where Do You Think You Are Going, Christopher Columbus*, Jean Fritz
   a. Discuss how Columbus and his crew were not alone on the voyages
   b. Columbus, other explorers, and settlers introduced many non-native inhabitants to the New World (grasses and wild flowers, horses, cows, pigs)

2. Guess whether animals are native or non-native
   a. Some introduced species (clover, dandelion, brown trout, rainbow trout, pheasant, carp, starlings, wild boars, nutria, killer bees, gypsy moths, Norway rat, English sparrow, Hungarian partridge,)
   b. Some native species (wood rat, bald eagle, bluebird, coyote, bear, white-tailed deer, cotton-tailed rabbit, field mice, raccoon, possum)
3. Research one of Virginia's inhabitants

Evaluation: Assess student abilities to name five species that are native to Virginia and five species that are non-native

SOL

Science: 4.1 Plan and conduct investigations
4.8 Study Virginia natural resources
English: Oral Language: 4.1 Use effective oral communication skills
Reading/Literature: 4.4 Read fiction and nonfiction
Research: 4.9 Use information resources to research a topic

Lesson 27: Virginia's Natural Resources

"Animal Charades" *Project WILD* p. 4

Objective: Students will be able to distinguish between domesticated and non-domesticated animals

Materials: Writing paper, container, pencils

Procedures:

1. Read *The First Dog,* Jan Brett
   a. Examine how humans domesticated (tamed) the dog
   b. Compare domesticated with wild animals
2. Play "Animal Charades"
   a. Write name, animal's name, and whether domesticated or wild on a slip of paper
   b. Draw a name from a container
   c. Portray and guess the animal

SOL Science: 4.1 Plan and conduct investigations
4.8 Study Virginia natural resources
English: Oral Language: 4.1 Use effective oral communication skills
4.2 Make and listen to oral presentations
Reading/Literature: 4.4 Read fiction and nonfiction

Lesson 28: Virginia's Natural Resources

"Dragonfly Pond" *Project Aquatic WILD* p. 154

Objective: Students will investigate and understand human impact on our natural resources

Materials: Copies of cut-out sheets *Project Aquatic WILD* p. 158,159, scissors, masking tape, glue, poster board

Procedures:

1. Read *Just a Dream,* Chris Van Allsburg
   a. Discuss how humans have altered the environment in Walter's dream
   b. Write about how you would like to see the environment in the future.

2. Activity:
   a. Distribute copies of cut-out sheets *Project Aquatic WILD* p. 158,159
   b. Divide the class into teams of four students
   c. Have each team represent an interest group (i.e, residents, farmers, business, gas station owners, parks department personnel, highway department personnel, bleach factory)
   d. Use cut outs to make a community around Dragonfly Pond
   e. Find the perimeter of Dragonfly Pond in metric and other standard units of length
3. Share team communities
4. Consider the consequences of human actions

Evaluation: Name three things that people can do to reduce or prevent damage to wetlands

SOL

Science: 4.1 Plan and conduct investigations
4.8 Study Virginia natural resources
Math: 4.14 Identify and describe situations representing the use of perimeter and use measuring devices to find the perimeter
English: Oral Language: 4.1 Use effective oral communication skills
Reading/Literature: 4.4 Read fiction and nonfiction
Writing: 4.7 Write effective narratives and explanations

Lesson 29: Virginia's Natural Resources

"Fishy Who's Who" *Project Aquatic WILD* p.86

Objective: Students will investigate and identify the major species of fish that live in Virginia

Materials: Paper, information sources (Internet, telephone, library, family members), pencils

Procedures:

1. Read *Fish Calendar,* Siegfried Schmitz
2. Activity:
   a. Make a list of fish that live in the state
   b. Identify the major aquatic habitats on a state map.
   c. Divide the class into research team
   ]
      1. Find sources of information (e.g., Department of Game and Inland Fisheries)
      2. Use sources to develop biographies of fishes that include fish's name, where it live, its habits, and interesting fish facts
      3. Sketch fish
      4. Share information

Evaluation: Assess the clarity and accuracy of reports presented by research teams

SOL

Science: 4.1 Plan and conduct investigations
4.8 Study Virginia natural resources

English: Oral Language: 4.1 Use effective oral communication skills
4.2 Make and listen to oral presentations
Reading/Literature: 4.4 Read fiction and nonfiction
Writing: 4.7 Write effective narratives and explanations
Research: 4.9 Use information resources to research a topic

Lesson 30: Virginia's Natural Resources

"Environmental Exchange Box" *Project WET* p.61

Objective: Students will increase their understanding of Virginia's natural resources

Materials: Books about state's natural history, markers, crayons, photos, and other art supplies

Procedures:

1. Read *Heron Street,* Ann Turner
   a. Discuss how Virginia has changed since the settlement of Jamestown in 1607
   b. Make a time line mural of Virginia's environment since 1607
2. Find another group (class) to exchange information
   a. Brainstorm items to include in the box
   b. Collect items
3. Examine contents of other's box
4. Based off information in the box, write stories about adventures in other lands

Evaluation:. Assess stories about adventures in other lands on how well students incorporate information in the box into their stories

SOL

Science: 4.1 Plan and conduct investigations
4.8 Study Virginia natural resource
English: Oral Language: 4.1 Use effective oral communication skills
Reading/Literature: 4.4 Read fiction and nonfiction
Writing: 4.7 Write effective narratives and explanations

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