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Integrated science unit : small creatures : spiders and crickets

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Integrated science unit : small creatures : spiders and crickets

Abstract

This instructional development project integrates the language arts and the science areas. The science content is small creatures, specifically, spiders and crickets, from the first grade curriculum. A rich learning environment is provided through a literature base, representing the different genres and related expressive activity. The unit is presented through teacher-directed activities and learning centers that offer many options from which children could select experiences.

The goals of the program are to give children more control over their learning and to extend children's thinking-language abilities by capitalizing on the common processes of the language arts and science areas and offering many opportunities to engage in the language processes within the functions of language. As children become involved in the content and processes of the unit provided by a print-rich environment with many options for learning activity, they can assume responsibility for directing their energies toward the learning tasks.

Integrated Science Unit: Small Creatures
Spiders and Crickets

A Graduate Project
Submitted to the
Department of Curriculum and Instruction
In Partial Fulfillment
of the Requirements for the Degree
Master of Arts in Education
UNIVERSITY OF NORTHERN IOWA

by
Pamela S. Olsen
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This Graduate Project by: Pamela S. Olsen

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Spiders and Crickets

has been approved as meeting the research article requirement for the
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Date Approved

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Abstract

This instructional development project integrates the language arts and the science areas. The science content is small creatures, specifically, spiders and crickets, from the first grade curriculum. A rich learning environment is provided through a literature base, representing the different genres and related expressive activity. The unit is presented through teacher-directed activities and learning centers that offer many options from which children could select experiences.

The goals of the program are to give children more control over their learning and to extend children's thinking-language abilities by capitalizing on the common processes of the language arts and science areas and offering many opportunities to engage in the language processes within the functions of language. As children become involved in the content and processes of the unit provided by a print-rich environment with many options for learning activity, they can assume responsibility for directing their energies toward the learning tasks.

A literature-based program provides a print-rich environment in which children can be engaged in whole units of language. Within such structures, children can create their own meaning. A literature base representative of the different genres offers fine models of language and interesting content that can naturally lead to many options for expressive activity. Therefore, a natural comprehension-composition connection is made. Children's thinking-language abilities are further nurtured because they are making use of the overlaps in the comprehension-composition tasks (Harms & Lettow, 1998).

A literature-based program has many components: Literature experiences that can extend such a program are reading aloud of quality works by the teacher, self-selected reading by the students, teacher-directed activities, and student-initiated activities. Works representative of the different genres can be presented in all curricular areas thus integrating the school program. Many expressive opportunities can be offered for children to convey the ideas they have generated from literature experiences (Routman, 1991).

A print-rich learning environment that nurtures children's personal-social abilities needs to be predictable and secure with activities both teacher-directed and child-initiated. Such options can include learning centers that extend children's involvement with the language processes and can support student's interactions with their peers (Harms & Lettow, 1992; Slaughter, 1998). The teacher through this type of learning environment can encourage risk-taking (Goodman, 1986).

Literature-Based Language Arts Extended to the Science Area

When a science unit is developed with an extensive literature base, the dimensions of learning are expanded (Langer, 1995). As a result, children can have in-depth experiences. A well-developed literature-base can facilitate the integration of the language arts into the science program. Such integration can contribute to the students' science understanding and retention of knowledge (Frew, 1990).

When the language arts program with a rich literature base is integrated into other areas of the curriculum, the instructional program can offer many meaningful experiences with the functions of language (Beane, 1995). Such an instructional approach provides real purposes for reading, writing, listening, and speaking (Goodman, 1986). Students need to be able to relate their school learning to their own lives (Routman, 1991).

An Instructional Development Project to Integrate Literature-Based Language Arts into the Science Program

For this first-grade unit on small creatures, specifically focusing on spiders and crickets, a literature-base with different genres and related expressive to accompany science activities was developed. First, the teacher searched appropriate web sites and the resources of the school and town libraries for background information and literature experiences and related expressive activities for first grade. These web sites were found:

Envirolink Homepage [http://www.envirolink.org/Gardening for Kids](http://www.envirolink.org/Gardening%20for%20Kids)

EnchantedForest/Glade/3313/ <http://www.geocities.com>

National Wildlife Federation's Homepage <http://www.nwf.org/>

These activity books were examined:

Koontz, Robin M. The complete backyard nature activity book. N.Y.:

Learning Triangle, 1998.

Silver, Donald M. Backyard (One small square). illus. Patricia J. Wynne. N.Y.:

Freeman, 1993.

From these references, teacher-directed activities and learning center activities were developed. The two types of learning centers that were developed were sustaining centers and those specific to the unit. Sustaining centers, maintained throughout the school year with their content reflecting the units of study, have much value as they provide a predictable and secure learning environment. The specific centers are based on literature experiences and related activities specifically related to the unit being studied.

Teacher-Directed Activities

These teacher-directed activities can introduce the concepts of the unit.

These videos can introduce the concepts of spiders and crickets.

Spiders: Backyard Science; Backyard Science Series. (St. Louis, MO: Phoenix, 1992)

Crickets: Backyard Science: Backyard Science Series. (St. Louis, MO: Phoenix, 1970)

From the video-viewing experiences, the children can create webs of major ideas for each small creature. The making will be ongoing: As the unit progresses, other major concepts and related minor ones can be added to the web.

The full-length book, Cricket in Times Square, by George Selden (New York: Ariel, 1960), can be read aloud daily. Because first graders are beginning to distinguish between fantasy and realism, the fantasy and factual elements of crickets as presented in this modern fantasy volume can be discussed.

The teacher can present several other activities to the students as the unit progresses. After Kate Petty's Spiders (New York: Franklin-Watts, 1985) is read aloud, the class can be divided into small groups to list important facts about spiders.

After reading aloud The Lady and the Spider, by Faith McNulty (New York: Harper & Row, 1986), a discussion can be conducted to emphasize that captivity

can be stressful for animals and that it is best to release them after a few days. The children can suggest some places where the spider can be released near the school grounds.

Another teacher-directed activity based on information from Simon & Schuster's Children's Guide to Insects and Spiders (1996) can be the construction of a Venn diagram. A Venn diagram is an illustration that compares and contrasts two different things with three overlapping circles. The overlapping space in the center contains ideas or statements that are true for both creatures.

The teacher can introduce the poetry form cinquain. Then, the children can compose poems focusing on the images of spiders and crickets.

Directions for cinquain poetry.

Line 1 - one word - An image

Line 2 - two words

Line 3 - three words

Line 4 - four words

Line 5 - one word - Summary word or synonym of the image on Line 1

Children can refer to the concepts on the web and the Venn diagram for images to write about in cinquains.

Student-Directed Activities

The children can begin to take charge of their learning by selecting activities from the learning centers.

Sustaining Centers

The literature in the sustaining centers reflects the study of spiders and crickets. These centers can support the study of this unit: reading/listening, poetry, author/illustrator, interesting objects, and bookmaking.

- Reading/Listening Center

This center can offer books from many genres and with accompanying teacher-made cassette tapes. It also can include puppets and flannelboard stories for retelling opportunities. Examples of books that can enrich the reading/listening experience specific to the unit can be found in the appendix.

- Poetry Center

This center can include a collection of poems from many poets with images of spiders and crickets. Teacher-made posters and accompanying cassette tapes of this poetry collection can be part of the center. These works are listed in the appendix.

- Author/Illustrator Center

This center can present the author/illustrator, Eric Carle, and his books that focus on small creatures. These books can be featured in the center: The Very Quiet Cricket and The Very Busy Spider. The center can include a brief biography of the author.

Expressive Activity: The students can paint sheets of paper with poster paint and cut out shapes from the paper to make a collage as Eric Carle has done for his illustrations.

- Interesting Objects Center

This center can contain exhibits collected by the students and the teacher that offer many sensory experiences. Examples of exhibits are: insects alive and dead, insect collections, magnifying glasses, photographs of insects, insect catching nets, and spider webs. Students can make terrariums for these small creatures by filling jars with dirt, twigs, and stones, and punching holes in the lids.

- Bookmaking Center

This center can supply materials for the students to use in bookmaking, such as paper of all shapes and sizes, crayons, markers, pens, pencils, and watercolors.

Centers Specific to the Unit

These centers can provide students with opportunities to respond to literature experiences and related expressive activities based on spiders and crickets.

- Spider Web Center

Goals: To learn how a spider spins a web, and then record the findings.

Literature Experience

Back, Christine (1986). Spider's Web. Morristown, N.J.: Silver Burdett.

London, Jonathan (1998). Dreamweaver. San Diego: Silver Whistle.

Expressive Activity

1. The children's findings can be the subject of an optional written report.
2. The students can create spider webs with yarn in the schoolground bushes.

- Cricket Sound Center

Goals: *The students will learn and report how crickets make sound.*

Literature Experience

Berger, Melvin (1998). Chirping Crickets. New York: HarperCollins.

Maxner, Joyce (1989). Nicholas Cricket. New York: Harper & Row.

Expressive Activity

1. The students can take the stop watch and can count the number of chirps a cricket in a jar makes in a minute while in the classroom. Then, the cricket in the jar can be taken outside, and the number of chirps for a minute can be counted. The temperatures on the thermometers in the classroom and the outdoors can be compared with the number of cricket chirps in the different locations.
2. The children's findings can be the subject of an optional written report.

- Cricket Habitat

Goals: To observe cricket behavior and to construct a nurturing habitat

Literature Experience

Bason, Lillian (1974). Spiders. Washington: National Geographic.

Gibbons, Gail (1993). Spiders. New York: Holiday.

Expressive Activity

The students can make a "Cricket Condo" by using a container with smooth plastic or glass sides. No top is needed because crickets cannot climb the container walls. Shelter for several crickets can be provided by placing egg carton cups on the bottom of the container. The temperature needs to be maintained at 75 - 85 degrees. The crickets can be fed dry dog food and bits of fruit. Water can be provided with a wet sponge.

Summary

A literature-based science unit can provide a rich learning environment for young children. Integrating the language arts with the science area allows children to engage in the processes of both areas while experiencing interesting content. Also, integrating these two areas facilitates efficient instruction: The natural overlap of the processes of these two areas reinforces children's learning. Children become more independent as they take charge of their learning experiences with the options presented through the centers.

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- Routman, R. (1994). Invitations. Portsmouth, NH: Heinemann.
- Slaughter, H.B. (1998). Indirect and direct teaching in a writing program. The Reading Teacher, 42, 30-34.

Appendix

Literature for the Sustaining Centers

Listening/Reading Center

Spiders

Information

- Back, C. (1984). Spider's web. Morristown, N.J.: Silver Burdett.
- Bason, L. (1974). Spiders. Washington, D.C.: National Geographic.
- Gibbons, Gail. (1993). Spiders. New York: Holiday.
- Johnson, J. (1996). Simon & Schuster children's guide to insects and spiders.

New York: Simon & Schuster.

- Kalman, B. (1997). Web weavers and other spiders. New York: Crabtree.
- Markle, S. (1994). Outside and inside spiders. New York: Bradbury.
- Oppenheim, J. (1998). Have you seen bugs? New York: Scholastic.
- Patent, D. (1982). Spider magic. New York: Holiday.
- Penny, M. (1986). Discovering spiders. New York: Bookwright.
- Schnieper, C. (1989). Amazing spiders. Minneapolis: Carolrhoda.

Realistic Fiction

- Bentley, D. (1996). If you were a bug. New York: Random.
- Graham, M. (1967). Be nice to spiders. New York: Harper & Row.
- Jukes, M. (1984). Like Jake and me. New York: Knopf.
- London, J. (1998). Dreamweaver. San Diego: Silver Whistle.
- McNulty, F. (1986). The lady and the spider. New York: Harper & Row.

Modern Fantasy

- Carle, E. (1984). The very busy spider. New York: Philomel.
- Kirk, D. (1995). Miss Spider's wedding. New York: Scholastic.
- Kraus, R. (1973). How spider saved Halloween. New York: Parents.

- Le Guin, U. (1979). Leese webster. New York: Atheneum.
- Maguire, G. (1994). Seven spiders spinning. New York: Bradbury.
- Sardegna, J. (1994). The roly-poly spider. New York: Scholastic.
- White, E.B. (1952). Charlotte's web. New York: Harper.

Folk Literature

- Appiah, P. (1966). Anansi the spider. New York: Pantheon.
- Arkhurst, J. (1964). The adventures of spider. Boston: Little.
- Kimmell, E. (1992). Anansi goes fishing. New York: Holiday.
- Koralek, J. (1989). The cobweb curtain: A Christmas story. New York: Holt.
- McDermott, G. (1972). Anansi the spider. New York: Holt.

Crickets

Information

- Berger, M. (1998). Chirping crickets. New York: HarperCollins.
- Cole, J. (1984). An insect's body. New York: Morrow.

Realistic Fiction

- Caudill, R. (1964). A pocketful of crickets. New York: Holt.

Modern Fantasy

- Carle, E. (1990). The very quiet cricket. New York: Philomel.
- Kherdian, D. (1982). The song in the Walnut Grove. New York: Knopf.
- Maxner, J. (1989). Nicholas Cricket. New York: Harper & Row.
- Selden, G. (1983). Chester Cricket's new home. New York: Farrar.
- Selden, G. (1981). Chester Cricket's pigeon ride. New York: Farrar.
- Selden, G. (1960). The cricket in Times Square. New York: Ariel.
- Selden, G. (1969). Tucker's countryside. New York: Farrar.
- Stafford, W. (1992). The animal that drank up sound. San Deigo: Harcourt.

Folk Literature

Czernecki, S. (1997). The cricket's cage. New York: Hyperion.

Poetry Center

Cole, J. (1991). The eentsy, weentsy, spider. New York: Morrow.

Hoberman, M. (1976). Bugs: Poems. New York: Viking.

Howitt, M. (1987). The spider and the fly. Woodbury, New York: Barron.

Lewis, J.P. (1998). The little buggers: Insect and spider poems. New York: Dial.

Lewis, J.P. (1995). Ridicholas Nicholas: More animal poems. New York: Dial.

"Cricket and Bullfrog"

Merriam, E. (1973). Outloud. New York: Atheneum.

"Crickets"

Worth, V. (1994). All the small poems and fourteen more. New York: Farrar.

"Crickets"