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Integrating literature-based language arts and science : a unit on frogs for kindergarten

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Integrating literature-based language arts and science : a unit on frogs for kindergarten

Abstract

Classrooms providing a literature-base program allow children to engage in the language processes and present opportunities for children to create meaning by surrounding them with high-quality literature representative of different genres. Many of the language arts and science processes are related and can be integrated in themes or units to connect children's learning.

A unit on the life cycle of frogs offered kindergarten children a rich learning environment through quality literature and related expressive activities. The literature-base extended to science developed a sense of community, increased science knowledge and connected reading and writing to the science study.

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A Unit on Frogs for Kindergarten

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Integrating Literature-Based Language Arts and Science:

A Unit on Frogs for Kindergarten

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by

Ruth Rysta

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Abstract

Classrooms providing a literature-base program allow children to engage in the language processes and present opportunities for children to create meaning by surrounding them with high-quality literature representative of different genres. Many of the language arts and science processes are related and can be integrated in themes or units to connect children's learning.

A unit on the life cycle of frogs offered kindergarten children a rich learning environment through quality literature and related expressive activities. The literature-base extended to science developed a sense of community, increased science knowledge and connected reading and writing to the science study.

The controversy over reading instruction is timeless though most educators agree that children learn to read by becoming involved in the language processes. The focus is on creating meaning through involvement in the language processes. Learners are supported in using language for their own purposes, developing thinking-language abilities, and discovering the nature of language (Goodman, 1986; Smith, 1994). Such an approach has been cited for years. One teacher in years past described how to foster young children's literacy:

“When a child can talk, 'tis time he should learn to read. And when he reads, put into his hands some very pleasant book suited to his capacity, wherein the entertainment he finds may draw him on, and reward his pains in reading. Aesop's fables with pictures may be made use of to this purpose. Talk often to him about the stories he has read, and hear him tell them. This will bring him to delight in reading and to express himself handsomely” (Waugh, 1752, 11, 12).

The teacher quoted from long ago would agree with many of today's educators, when children are given the opportunity to interact with quality literature, their literacy is extended (Huck, 1996).

Literature works representative of the different genres and related expressive activities can provide a rich school environment in which children can be actively engaged in meaningful experiences that connect with their prior knowledge (Smith, 1994; Harms & Lettow, 1998). Such a

learning environment can support children's emerging literacy and can promote the beginning of lifetime interest in reading (Galda, Cullinan, & Strickland, 1997).

Literature-Based Language Arts Extended Across the Curriculum

Literature can assist in integrating the language arts across the curriculum (Routman, 1991). The different genres (fiction, folklore, poetry, biography, and nonfiction) can extend the dimensions of learning associated with a theme or a unit (Langer, 1995).

In early childhood classrooms, the science curriculum is based on the students' known world. This age group is curious about their world. By integrating a literature-based program with science, the students' discoveries of their world are extended.

The area of science can be abstract for young children. The narrative texts of literature works provide more concrete experiences, thus the ideas are more easily comprehended. However, it is not unusual to find school districts purchasing science programs with textbooks that present highly compact, abstract concepts. Textbook presentations are difficult for children to understand (Butzow & Butzow, 1989). Using quality literature in science exposes children to richer language than in a science textbook (Langer, 1982).

Quality literature supports the integration of the curricular areas. While implementing a literature-base extended across the curriculum, the subject areas provide content and natural experiences with the functions of language (Norton, 1982; Routman, 1991; Bosma & Guth, 1995). Extending a literature-based program to the science area offers children opportunities to engage in the language and science processes that are common in many instances.

Literature-Based Language Arts Extended to a Science Unit on Frogs

A literature-based science unit on frogs was developed and presented to my kindergarten class during the spring of the year. It was a part of the school's established curriculum on living/nonliving things. The students were given an opportunity to select what animals were to be included in this section of science study. There was a unanimous agreement to include frogs in the study. It was a developmentally appropriate topic because frogs are familiar to the children. The students were beginning to see frogs on the roadsides, in their yards, and around ponds during the spring. The science experiences were offered through teacher-directed instruction and student-initiated activities that were presented through sustaining centers and centers specific to the unit. Many of the experiences were based on literature works from the different genres. The sustaining centers remained in the

room throughout the year. Their content changed as the units were presented (Harms & Lettow, 1998). The content and activities presented in the centers specific to the study were connected to the national standards (Kendall & Marzano, 1999).

Teacher-Directed Learning Activities

The teacher introduced the unit on frogs by presenting a small box received in the mail. The words “handle with care” and “live animals inside” were on the box. After discussing the size of the box and the words on the box, the students were asked what they thought might be inside. Their responses were listed on the white board. Then, the teacher read aloud Baby Bird’s First Nest, by Frank Asch (Harcourt Brace & Co., 1999). The story is about a baby bird and his friend, a jumping frog. After reading and discussing the story, the teacher and the class turned to the box and made a final decision about what animal(s) might be inside. Everyone was excited to find eight African Water Frog eggs in the box. One response from a boy was “Wow those don’t look like the frogs I’ve seen and look at all of them.”

The next teacher-directed activity introduced the life stages of the frog. The students liked learning the big word “metamorphosis” and went home to share a new, large vocabulary word. After reading the stories, From Tadpole to Frog, by David Stewart (Topeka: Econo-Clad Books, 1998) and Tale of a Tadpole, by Karen Wallace (LaVergne: D.K. Publishing, 1998),

the students worked in groups to design drawings to show the different stages of frog life. These drawings were displayed in the hallway so their work had an audience of their peers, older students, and faculty members.

In another session, the teacher read Frog and Toad Are Friends, by Arnold Lobel (New York: Harper and Row, 1970). It was the first chapter book the teacher had shared. Special emphasis was placed on the chapter "The Lost Button." After discussing the chapter, the students were asked to bring in buttons. A note asking for buttons and explaining the activities that would be associated with them was sent home with the children. The related activities included observation, pattern, classification, and evaluating tasks (see Figure 1).

Figure 1

Expressive Activity Associated with Frog and Toad As Friends



The students reviewed nonfiction literature and made a plan to care for the three tadpoles that survived (see Figure 2).

Figure 2

Live Frog Center with Nonfiction Literature



The other kindergarten class was also invited to listen to the Five Green and Speckled Frogs, by Martin Kelly (New York: Handprint, 2000) read aloud. Students were asked to bring in treats to share that reminded them of frogs. Before eating anything students described their food and told why they brought it. One food item was celery with peanut butter and raisins called "ants on a log". The student who supplied those said, "Log rhymes with frog, and our frogs sat on a log." Many green foods were shared though one student brought red candy called red hots because it reminded him of the frogs in Red-Eyed Tree Frog, by Joy Cowley (Scranton: Scholastic, 1999). A class book made by the kindergarten class was shared with the other students in the school to show what each child learned about the water frogs, such as the different types of environment of frogs, the stages of the frogs' life, and the many different colors of frogs.

Learning Centers

During the frog unit, literature-based activities for student selection were offered in the form of learning centers. Two types of centers - - sustaining centers and centers specific to the concept of frogs - - were presented. Students were engaged in the language processes through their participation in these centers.

Sustaining Centers

These sustaining centers were offered for the unit on frogs:

listening/reading, poetry, author, interesting objects, and bookmaking.

- Listening/Reading Center

Picture books, both fiction and information, on frogs were presented in the listening/reading center. Many of the books were accompanied by a tape. The children were encouraged to share their favorite part of the story with a partner or draw a picture of it. The children conferred with the teacher about interesting ideas found in a particular selection. The books listened to below were part of the center.

Asch, Frank. (1999). Baby Bird's First Nest. San Diego: Gulliver.

Bach & Watts. (1984). Tadpole and Frog. Lebanon: Silver Burdett.

Cowley, Joy. (1999). Red-Eyed Tree Frog. Scranton: Scholastic.

Darby, Gene. (1957). What is a Frog? San Diego: Benefit.

Gibbons, Gail. (1993). Frogs. New York: Holiday House.

Henwood, Cris. (1988). Keeping Minibeasts-Frogs. London:

Franklin Watts.

Hinshaw, Dorothy. (1997). Flashy Fantastic Rain Forest Frogs.

New York: Walker.

Hindley, Judy. (1998). Leap Froggie Leap. New York: D.K.

Kalan, Robert. (1981). Jump Frog Jump. Scranton: Scholastic.

Lionni, Leo. (1985). It's Mine! Westminister: Knopf.

Lionni, Leo. (1987). Fish is Fish. Westminister: Knopf.

Lobel, Arnold. (1970). Frog and Toad Are Friends. New York:

Harper & Row.

Pallotta, Jerry. (1990). The Frog Alphabet Book. Watertown, NY:

Charlesbridge.

Reece, James. (1995). Lester and Clyde Running Scared. Scranton:

Scholastic.

Relf, Patricia. (1994). My Little Book of Frogs and Toads. New

York: Western.

Robinson, Fay. (1999). Fantastic Frogs. Scranton, NY: Scholastic.

Royston, Angela. (1991). See How They Grow FROG. New York:

Lodestar.

Wallace, Karen. (1998). Tale of a Tadpole. LaVergne, NY: D.K.

- Poetry Center

Poetry and songs were selected from different works and presented at the poetry center. The teacher introduced selections of poetry and songs to the whole class during fingerplay/poetry time. Students also became leaders for favorite fingerplays, poetry, and songs. The selections were then put on charts to be placed in the poetry center.

The songs and poems were also placed in the student's reading folders and taken home for family members to listen to and respond. Supplies for illustrating and writing were at the center along with a tape recorder, charts, and copies of poetry. Students then illustrated and/or wrote their feelings about the poem or song as they listened to the teacher-made recordings. These poems and songs were included in the center.

George, K.O. (1997). The Great Frog Race and other Poems. New York: Clarion. "The Great Frog Race"

Kelly, Martin. (2000). Five Green and Speckled Frogs. Brooklyn: Handprint.

Larrick, Nancy (Ed.). (1991). To the Moon and Back: A Collection of Poems. New York: Delacorte. "The Frog"

Paprocki, Susan. (1990). Animal Piggyback Songs. New York: Random. "Listen to the Frog" and "Hoppity Toad"

Prelutsky, Jack. (1983). Random House Book of Poetry. New York: Random. "The Tree Frog" (John Travers Moore)

Schneider, Paula. (1990). Animal Piggyback Songs. New York: Warren. "Frog in the Pond"

Snyder, Zilpha. (1969). Today is Saturday. New York: Atheneum. "Frog"

- Author Center

A small aquarium was included in this center, along with books and art materials. The books of the children's author, Jonathan London, were explored in this center. London enjoys the outdoors and writes fiction stories about elements of the natural world, often with a humorous slant. His books with frog images were written for his second son and gave opportunities to the children to experiment with the wonder of sound and to enjoy the repetition and humor of the story. Included in the center were pictures of London, his family members, and his series of frog books (see Figure 3).

Figure 3

Author Center with Children's Writing Responses



I Like Frogs becs
He is a frog
UP WITH but He is a frog
TOO SWIM. He LRD HUW

I Like Froggy
He is Funny.
My Favrit Part was
When The Mom
Side 'Froggyyyyyy!'

Kevin

Amy

London's books were recorded on tape. Materials were included in the center to support drawing and writing about the humorous ideas presented in London's books. His books included in the center are listed below.

Let's Go Froggy (1994). New York: Viking.

Froggy Goes to School (1996). New York: Viking.

Froggy Gets Dressed (1992). New York: Viking.

Froggy Plays Soccer (1999). New York: Viking.

Froggy Bakes a Cake (2000). New York: Viking.

The students learned that London will have a new froggy book published in December 2001.

- Interesting Objects Center

The objects that were placed in this center were related to frogs and their environment. They offered the opportunity for the students to use their senses. Items included were frog puzzles, plastic frog counters, materials representing the real feeling of frogs, things found around ponds (sand, rocks, snails, moss), cards with pictures of the life cycle of frogs, scratch and sniff stickers of frogs, color palates with the different colors of frogs and pictures of frogs to match, frog hats, gummy frog candy, rock frogs, the smallest aquarium with one of our tadpoles, and many different types of frogs brought in by the students.

- Bookmaking Center

Each child had their own shoebox library. In the bookmaking center, the students could make little books that they could read and add to their libraries. The children made several books about frogs changing and growing. Their completed books were read to the entire class, and then the student pairs read their books to each other. Some of the books were presented to the school library.

Centers Specific to the Unit

Literature-based centers related specifically to the study of frogs were also presented. Careful consideration was given to national standards across the curriculum (Kendall & Marzano, 1997). All the centers were introduced by the teacher. Some centers had taped directions available, and others had rebus cards to help children get a good start

- Eggs Center

Science Standard K-2: Knows that learning can come from careful observations and simple experiments.

Language Arts Standard K-2: Listens and responds to oral directions.

Relates new information to prior knowledge.

Literature Experience:

The book by Ruth Heller, Chickens Aren't the Only Ones (New York: Price, 1973), was listened to on a tape.

Expressive Activity:

A basket of plastic eggs were filled with pictures of different animal eggs.

Children looked at the pictures and tried to sort them in different ways.

They were also asked to draw a picture of one of their eggs and show what animal came from it and then label the picture.

Student Responses:

The novelty of the plastic eggs with pictures inside was a popular center among the children. The children who had less prior knowledge referred to Heller's book to assist them in the identification process.

- Frog Puppet Center

Science Standard K-2: Knows that plants and animals have features that help them live in different environments.

Language Arts Standard K-2: Listens to and recites familiar stories, poems, and rhymes with patterns.

Language Arts Standard K-2: Summarizes information found in texts (e.g., retells in own words).

Literature Experience:

The book by A. Robinson, See How They Grow FROG (New York: Lodestar, 1991), was listened to on a tape.

Expressive Activity:

From this literature experience, children retold the story and other stories with frog motifs through puppets (see Figure 4).

Figure 4

Story Retelling Through Puppets



Student Responses:

Most students enjoyed retelling the stories. One little boy's mother said at a conference that the Frog Puppet Center was his favorite center and that he would like to make the same thing at home.

- Patterning Center

Science Standard K-2: Understands basic features of the earth.

Knows that learning can come from careful observations and simple experiments.

Language Arts Standard K-2: Demonstrates competence in speaking and listening as tools for learning.

Mathematics Standard K-2: Understands and applies basic and advance properties of the concept of patterning.

Literature Experience:

The book by Lydia Sharman, The Amazing Book of Shapes (New York: Dorling Kindersley, 1994), was listened to on a tape.

Expressive Activity:

The children referred to the section in the book about shapes and patterns and used the shape stencils and pattern grids from the book to make simple patterns. After using the book materials, they sorted containers of different types of plastic frogs and used stamp pads to make patterns with them.

Going from the concrete to a more abstract patterning task, the students labeled their frog patterns.

Student Responses:

The students created different pattern strips with the stamps. It was necessary to model and have the children read their patterns frequently as some only wanted to decorate their strips.

- Exploring Numbers with Frogs Center

Science Standard K-2: Makes simple inferences regarding the order of events and possible outcomes.

Mathematics Standard K-2: Demonstrates numerical skills and recognition.

Language Arts Standard K-2: Recognizes the characteristic sounds and rhythms of language.

Literature Experience:

The book by Kelly Martin, Five Green and Speckled Frogs (New York: Clarion, 2000), was listened to on a tope. Also, The Science Book of Numbers (San Diego: Gulliver Books, 1992) was viewed. The lyrics of Five Green and Speckled Frogs were also sung.

Expressive Activity:

Frogs and logs were available in this center. Students worked alone or with a partner to count and recognize numbers as they manipulated the frogs

and logs (see Figure 5). The song about the frogs jumping into the pond gave the opportunity to work on subtraction skills. After using the manipulatives the students did a more abstract task using paper and pencil to write a number sentence.

Figure 5

Exploring Numbers with Frogs Center



Student Responses:

The song from Five Green and Speckled Frogs was requested more than any other song during the year. The repetition and rhyme made it fun for the children to interact with. Also, the added attraction of learning how to subtract by manipulating the song was appealing to the children. Being able to do their own number sentences and share them with family made this center popular.

- Live Animal Center

Science Standard K-2: Knows that tools (e.g., thermometers, magnifiers, rulers, balances) can be used to gather information and extend the senses.

Science Standard K-2: Knows that plants and animals need certain resources for energy and growth.

Science Standard K-2: Knows that plants and animals have features that help them live in different environments.

Language Arts Standard K-2: Uses books to gather information for topics (e.g., uses table of contents and examines pictures and charts).

Language Arts Standard K-2: Uses frequently used words to convey a basic idea in writing.

Literature Experience:

The class revisited the nonfiction books that were presented in teacher-directed activities. Two favorites were Frogs by Gail Gibbons (New York: Holiday House, 1993), and Flashy Fantastic Rain Forest Frogs, by Dorothy Hinshaw (New York: Walker, 1997).

Expressive Activity:

In this center, the children observed live tadpoles, water and amphibious frogs, beta fish, and a lizard. Animals were displayed in small aquariums. The children used thermometers to test water in different containers and then record the differences. They used rulers to get approximate measurements of the animals and compared and contrasted the different sizes.

Student Responses:

Many students questioned why the tadpoles in the larger aquarium were getting larger in size than the tadpole in the small aquarium. From the discussion, the children discovered that animals grow according to the size of their environments. The children enjoyed these observations and recorded them in their journals.

Conclusions

Integrating literature-based language arts and science areas in the curriculum enriched the unit on frogs. A rich learning environment with much literature gave the children many opportunities to engage in the language processes within the science area. Through involvement in the learning centers, the children became more independent and took ownership for their learning experiences. Parent responses to the unit were surveyed with a simple questionnaire. From their responses, the unit was an excellent learning experience.

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