

Ann Lewin-Benham

One Teacher, 20 Preschoolers, and a Goldfish

Environmental Awareness, Emergent Curriculum, and Documentation

TEACHING PRESCHOOLERS ABOUT THE ENVIRONMENT is hard. Many complex concepts are involved: the interactions among everything on the planet—air, land, water, and all living things; the systems that determine weather and climate, food supply, energy resources, and the quality of life for every plant and animal; systems operating on a planetary scale or in geologic time; the organisms living in a single water drop. Chemistry, geology, physics, and biology all intersect in discussions on the environment.

This article shares the experiences of one teacher in helping preschoolers learn about the environment. The article is based on my lifelong concerns for the environment, on my own experience helping children learn to take care of a goldfish in a preschool classroom, and on a composite of many different efforts—my own and other teachers’—helping children learn about the environment. It is also based on three of my own beliefs:

1. Most young children are eager to learn about the environment.
2. A teacher who lives an environmentally friendly life can be effective in teaching young children about the environment.
3. The emergent curriculum approach (Rinaldi 1992; Jones & Nimmo 1994), including documentation, is well suited for encouraging children to develop environmentally aware behavior.

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Return to the main menu of this issue of [Beyond the Journal](#) for a listing of curriculum activities and suggested books plus a compilation of further resources on environmental education for adults and children.



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These beliefs are reflected in this article through enthusiastic children, a teacher respectful of environmental concerns, and the success of the emergent curriculum in arousing and building on children’s interests.

Social constructivist theory

The theoretical base for the use of an emergent curriculum is social constructivist theory. Briefly, we can infer from the theory that learning occurs when children are engaged in collaborative activity about something that deeply interests them and that the teacher’s role is to collaborate with the children in their exploration so her knowledge can scaffold their understanding. “Learning and development emerge from the dynamic interaction of social and individual factors” (John-Steiner, Panofsky, &

Smith 1994, 6). Today numerous psychologists and social theorists have confirmed the idea, first proposed by Lev Vygotsky, that learning is a social process (Feuerstein, Klein, & Tannenbaum 1991; John-Steiner, Panofsky, & Smith 1994; Resnick & Hall 1998; Bronfenbrenner 2004).

Social constructivist theory is robustly practiced in the schools of Reggio Emilia, Italy. In these schools projects emerge through teacher collaboration with small groups of children. The projects are based on teachers' thoughtful listening to children's conversations to determine their deep interests and on subsequent focused talk with the children about these interests. The Reggio structure also involves a carefully designed classroom that functions as a "third teacher," and as such frees the teacher to engage in projects. Literature describing these schools and certain Web sites will acquaint those unfamiliar with the Reggio Emilia approach (see Jones & Nimmo 1994; Edwards, Gandini, & Forman 1998; Lewin-Benham 2006; visit the Web sites of NAREA and Reggio Children).

Projects are based on teachers' thoughtful listening to children's conversations to determine their deep interests and on subsequent focused talk with the children about these interests.

Ms. Putnam, 20 children, and a goldfish

Ms. Putnam, a preschool teacher, wanted to arouse children's concern for the environment and to inspire them to think and act in ecologically sound ways. An evolving chain of experiences about the environment emerged from the introduction of a goldfish to her class.

In September Ms. Putnam made five commitments. During the coming year she would:

- bring into the classroom things related to the environment.
- listen closely to children's conversations and observe their activities and explorations around the items, then use the children's interests as the basis for projects.
- use related vocabulary often and read aloud books on the environment twice weekly.
- keep parents informed so they could reinforce the topic at home.

Emergent Curriculum

Rather than sets of lesson plans and objectives, emergent curriculum is a *process* that roughly follows these steps:

1. Select a topic that reflects interests expressed by children in their conversations or that you as their teacher suspect may be of high interest. Ms. Putnam brought a goldfish to school with the idea that the children's care of the fish might interest them in exploring environment-related subjects.
2. Brainstorm, alone or with colleagues, the many ways the experience could develop to ensure that the topic has rich "generative" (Perkins 1992, 92–95) potential. As it evolves, the project may or may not follow what you brainstormed.
3. Use something concrete—from the children, their families, or the teacher—to pique initial interest and to maintain it. The concrete "thing" may be children's own words as recorded by the teacher. Ms. Putnam used children's questions about the goldfish as the starter for many pursuits. Throughout the year she recorded, saved, and studied the children's conversations and kept using their words to arouse further interest.
4. Tape or take notes of the children's words as they react. Study their words to determine what *really* grabs their attention. You may let a day or more pass to heighten the children's anticipation and to allow yourself time to study their words.
5. Continue to bring the children's own words back to them: "On Monday you said the fish's water was really dirty. Joey said, 'It's full of poop.' Would you like to help me clean the fishbowl?"
6. Brainstorm what might happen before any new activity. Knowing she wanted to build environmental awareness, Ms. Putnam had a container available to save the dirty water. When the children asked why she was saving it, she asked, "What do you think we could do with this water?" Again she recorded and studied the children's answers, and brought back those that she had selected for their potential to spark environmental awareness.
7. Use children's words, some particular things they have made, or photo(s) taken during the process as the stimulus for the next steps.
8. Document the experience as each step happens. Record the story of the emerging project as *it emerges*, using children's words, photos of them, their drawings or other work, and a photojournalistic-type retelling. (See "Documentation.")

- follow an emergent curriculum approach—teaching through small group projects, documenting the projects, and revisiting the documentation.

Where do subjects for in-depth projects come from? Miss Putnam knew that the information she needed for projects to emerge would come from a variety of sources: actively conversing with the children, listening to their conversations with each other to determine what they already knew and what else they wanted to know, and studying her notes on these conversations. Having decided to bring a goldfish to the classroom—because she believed it would be of great interest to the children—she brainstormed concepts that might emerge over time. Her list included the following areas:

- the ecosystem a goldfish requires
- energy sources for living things
- clean and unclean water
- waste disposal
- relationships between living things and the environment

The goldfish arrives

On the day Ms. Putnam brought the goldfish to school, Joey, the most active four-year-old in the class, spotted it immediately: “Ms. Putnam, what have we got?” She knew his enthusiasm would spread. During group time she asked Joey to describe what he had seen: “It’s orange, and it’s swimming, and . . .” jumping up and pointing, “it’s THERE!”

Carefully, Ms. Putnam carried the bowl to the full class meeting. Immediately, an animated conversation ensued. Ms. Putnam made



notes on the children’s comments and, over the next few days, took photos of them observing the fish. After analyzing this information she determined which children were most interested in the goldfish. She created a documentation panel with the heading “Joey Discovered a New Fish” and two photos of children observing the fish, and she hung the panel in the classroom. Later she discussed the panel with the small group of children whom she had observed were most interested. Revisiting the panel with the children revealed more of their ideas because it sparked another conversation.

As the children and teacher discussed the panel, questions tumbled out:

- Where did the goldfish come from? The stream near the school?
- Where did you get the bowl?
- Can we feed the fish from our lunchboxes?
- How does it poop?
- Can I hold it?
- Will it have babies?
- Can I take it home?
- Will it get old and die?
- What do you do with a dead fish?

Like most children, the four-year-olds in Ms. Putnam’s class are interested in everything around them. Even by age 4 they have had many experiences, and know more than adults may realize. They are naturally empathetic, know instinctively if living things feel sad or are hurt, and express their concern with words and hugs. Ms. Putnam felt certain she could focus their empathy on the environment, helping them to acquire a sense of what the environment is, an awareness of all living things’ needs, and some knowledge of how those needs relate to the environment (Gardner 1991). From the children’s comments, she added this one to the documentation panel: “How can we get this poop out of the water?” She also added a photo of the fishbowl with its dirty water.

That evening Ms. Putnam matched the concepts she had originally brainstormed with the children’s questions (see “Relationship between the Teacher’s Ideas and the Children’s Interests”). The comparison convinced her to use the children’s own questions to begin exploring environmental issues with them. She added two of their most fertile questions to the panel: “How can we clean the water?” and “What will we do with the dirty water?”

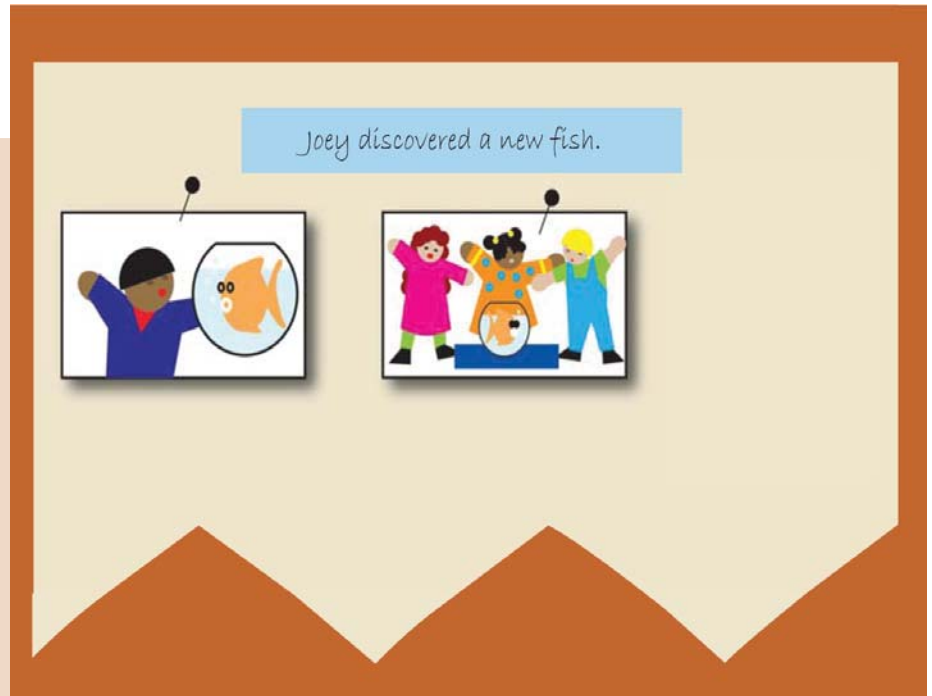
Planning for learning

In educating children about anything, a teacher needs to determine what they already know and find the intersections between her perceptions and their interests. Teachers use this information to decide what to do next (Vecchi

Documentation

Documentation is the process of recording children’s thoughts and actions on a topic to maintain their focus and expand their interest. It works like this:

1. As an experience begins, create a large panel out of sturdy cardstock or illustration board. Write a question, repeat a child’s comment, or make up a title as a headline for the panel. Include a photo, a drawing, or an object to show what sparked the project.
2. Continue to add information to the panel as the experience continues. Information can be key words from the teacher or children, a child’s drawing, or a photo or series of photos of the children, even an object. The information should reflect a pivotal moment which led to next steps. Ms. Putnam added a photo of the full class at the first group meeting with the fishbowl in the center, one child’s comment, and one question each from two other children. As the project continued, she added drawings of children’s ideas for how to clean the fish bowl—one a theory, the other the process the class eventually adopted.



3. Whenever a panel is hung or words or photos are added, and before continuing the experience, gather the children who were involved, and read the panel to them (or have them “read”—retell—to you) what has happened thus far. This is called *revisiting*. Ms. Putnam and the small group revisited the panel at least once a day.
4. Add whatever photos and comments or questions bring the experience to a conclusion. In this case, Ms. Putnam added a series of photos—cleaning the fishbowl, discovering Big Eyes dead, everyone crying, and the fish’s grave. At the end she added two children’s questions which stimulated new projects: “What are we going to do with the dirty water?” and “What will happen to the dead fish?”

A finished documentation panel should convey what started the experience, how it developed and why, and its outcome or the open-ended questions it sparked.

A finished documentation panel should convey what started the experience, how it developed and why, and its outcome or the open-ended questions it sparked. As children revisit panels, they begin to retell the experience to themselves, to one another, and to their parents or classroom visitors. Revisiting helps the experience move forward, keeps the children focused, and deepens their understanding of their experiences. Documentation gives parents and visitors a window into life in the classroom and builds both appreciation for and trust in the school.

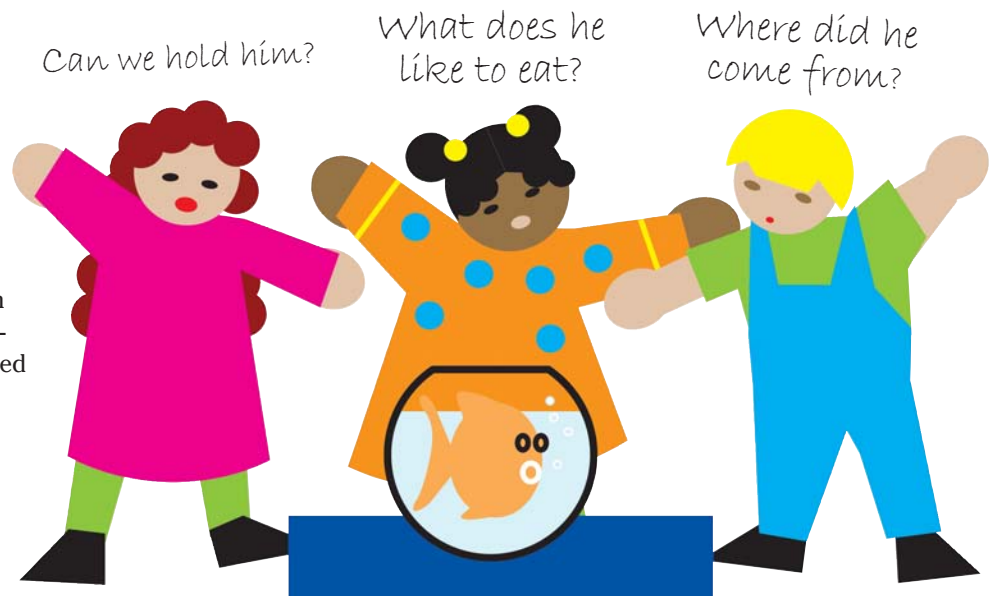
1994). Through analyzing her own brainstorming list and comparing it to the interests children expressed, Ms. Putnam hypothesized that an environmental curriculum in her classroom, sparked by the children's interest in the goldfish, could cover these topics: ecosystem; land, water, and air; food and energy; pollution. The curriculum would emerge as children's investigations and activities led to the evolution of old interests and the development of new ideas. How she prepared the classroom environment and documented the children's experiences would be critical. Ms. Putnam asked herself if she could also:

- Care for an animal in addition to the plants already maintained in the classroom?
- Model environmentally conscious behaviors for the children consistently? For example, could she
 - make sure to turn out lights *whenever* the class left the classroom or sunshine provided adequate light and each time tell the children her actions were taken to save energy?
 - teach the children to conserve by running only a trickle of water then turning it off while soaping hands or brushing teeth?
 - set up a system to segregate leftover food, paper, glass, and plastic, and with the children analyze which leftovers could be reused and how? During meals, Ms. Putnam began to play a game with the children, Compost Collection, in which they discussed what leftovers would make good compost. This sparked the children's curiosity about what to do when the compost container was full, and led to a project to develop a compost pile in a remote corner of the play yard.
- Reach beyond the classroom to engage in environmentally friendly efforts? For example, she
 - toured the school with the children to detect how to save resources
 - asked parents to send to school examples of community environmental activities. One family sent an article about the installation of energy-saving light bulbs in the local public libraries. Ms. Putnam read every item to the whole class, and discussed it in depth with those children who were most interested. Often the children had their own theories, which Ms. Putnam recorded, studied, and later discussed with them. On subsequent days she had them draw pictures or represent their ideas in other materials, like paper, cardboard, clay, wire, or blocks.
 - invited parents to help on field trips. One involved a visit to the city's waste recycling plant, another to a nearby stream to look for effects of pollution.

Using observations and conversations to facilitate learning

For several days after introducing the goldfish, Ms. Putnam left a tape recorder next to the fishbowl to capture the children's comments. As the children observed the fish, she took photos and added two to the panel. All the children visited the fishbowl at least once a day, most two or three times; five children were regulars, sometimes checking on the fish several times a day and naming it Big Eyes. Children's comments on tape ranged from how fish are born to fish weddings, death, play, and fighting. Most often the children wondered how fish get food, what happens when they poop in the water, and how to clean the water.

After observing and revisiting the panel with the children and while excitement was still high, Ms. Putnam revisited the panel again with the five most interested children and asked, "What else would you like to know



about the fish?" Questions poured out. Ms. Putnam then asked another question: "How can we find out?" "These two questions are powerful and universally applicable. The first taps the wealth of experiences even very young children have already accumulated. The second stretches them to make connections from one particular bit of information to their other ideas, which adults cannot intuit" (Lewin-Benham 2006, p. 51).

From this discussion Ms. Putnam realized the children knew these things: the fish should be fed just once daily, it pooped a lot, and its water was already dirty. This bothered them, and they wanted to do something about it.

Ms. Putnam asked the five children, "Can you draw pictures showing how we could clean the bowl?" She added two of the children's drawings to the panel. Two days later,

she gathered the five children again, revisited the panel, and asked them to use their drawings to describe to one another how to clean the bowl. Their ideas ranged from fantasy—using a magic vacuum that unrolled from a long tube—to reality—finding ways to clean the bowl without hurting Big Eyes, since cleaning utensils might be rough and cleansers could poison him. Danielle, one of the children, had been to a pet store where she gleaned this information, which she then shared with the others during one of their many small group discussions.

Ms. Putnam suggested that the group discuss which method would be best and then make one drawing to represent it. Several more days passed as the children debated among themselves, sometimes arguing fiercely, often joined by Ms. Putnam. They finally agreed on how to clean the bowl: Catch Big Eyes in a fish net (Danielle had seen this in the pet store also), put him quickly into a pitcher of clean water, empty the old water, carefully scour the bowl, then pour in Big Eyes, clean water and all. The group collaborated on making one drawing of this process, which Ms. Putnam added to the panel.

Big Eyes dies!

Because the class had not allowed the changing water to stand overnight so the chlorine could evaporate, Big Eyes did not survive the change. Ms. Putnam had not told the children this vital knowledge, something she knew but, in the excitement, had forgotten to share with them. The children were distraught. Ms. Putnam blamed herself. The children saw how sad she was.

“Hey! I know,” Joey exclaimed. “Let’s go to the pet store and buy a new fish!”

Teacher and children cried—all still sad about Big Eyes, Donnie and Charles in distress at Ms. Putnam’s sadness, Danielle and Darrell not to be left out, Ms. Putnam upset at her omission and deeply moved by the children’s compassion. “What are we gonna do with Big Eyes?” asked Joey. Crying ceased as the children began a conversation that became animated. Many ideas later, they toured the yard and

found an ideal spot to bury Big Eyes—under the pussy willow, their favorite with its soft, silky-haired blooms. Ms. Putnam added a photo of Big Eyes’s grave to the documentation panel. She saw the echoes of this powerful experience in many of the projects that emerged later that year.

Emerging projects

The experience with Big Eyes sparked a new project on the environment with these themes: What happens when dirty water is poured on the earth? What is earth? What would happen to Big Eyes in the earth? Ms. Putnam documented the earth project on a second panel. A small group went with her to the pet store to buy a new fish in response to Joey’s suggestion (the subject of a third panel). The children were full of questions about how stores find fish. This led to a project on ecosystems that support different fish. By year’s end the children’s evolving interests led to:

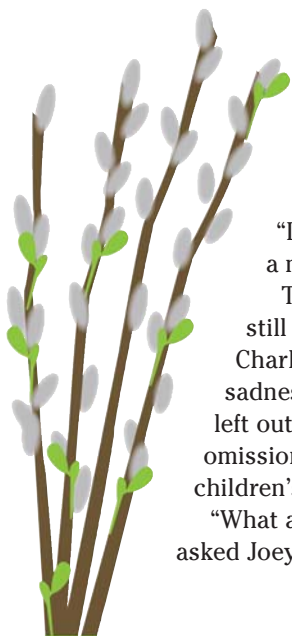
- Questioning what’s in water and how evaporation works.
- Reading the fish food label, which prompted a big project on food sources.
- Carefully watching the ceaseless swimming of the new fish, which led to a project on energy.
- Discussing how pollutants get into air and water.
- Studying the labels on cleansers, which resulted in a search for environmentally friendly cleaning products and replacing commercial cleansers with homemade solutions of baking soda, vinegar, and water, natural products that the children learned would not pollute.

When the children learned how dangerous plastic can be to wild animals, they organized a Plastic Patrol and involved their families in a clean-up day. When they learned that fish poop makes good fertilizer, they went on a hunt for other waste to recycle, and visited their town’s recycling center.

Each project involved only a small group, generally different for each project. Ms. Putnam documented every project on its own panel. Usually the entire class toured each panel, led in small groups by the children involved. With one group, Ms. Putnam wrote to parents discussing how to use the classroom’s environmentally friendly practices at home. The whole class read the letter; several children added words and drawings, and everyone carried a copy home.

It was possible for Ms. Putnam to teach to a small group for two reasons. First, there were two adults in the class—

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room. Second, the classroom environment was richly prepared. “In practice this means . . . [the teachers] trust the environment as much as they trust one another, and create a three-member team from two teachers and an environment. Their painstaking organization results in environment-guided activity that is as valuable as teacher-guided activity” (Lewin-Benham 2006, 14–15).

A year in review

At the end of the year Ms. Putnam reviewed her teaching and the children’s learning. Projects on a wide range of areas covered 10 different panels. She had learned to be more thoughtful about when to add her own knowledge to the children’s explorations. This is the essence of emergent curriculum: the learning that results for children *and* teacher from the teacher’s knowledge and skills through collaboration with the children. Because the teacher scaffolds the children’s ability, it makes it possible for her knowledge to merge with, expand, or alter their knowledge. What the children learned was evident in their

- favorite books, like *Cactus Hotel*, about a saguaro’s life cycle and relationship to other desert plants and animals;
- daily vocabulary, which now included words like *environment, relationship, impact, pollutant, and earth-friendly*;
- drawings, which showed increasingly thoughtful ideas about the environment;
- interest in food content, concern about clean air and water, and knowledge of the plants and animals that lived near the school;
- comments, like Joey’s after burying Big Eyes: “You see, we’re all connected to everything, fish to insects, insects to earth, earth to goldfish, what we eat to earth. It’s all connected.”

Conclusion

Ms. Putnam’s experience illustrates how to raise preschool children’s environmental awareness. Her approach was grounded in the social constructivist theory that we learn through relationships with others who mediate our interactions with things around us. Her approach was influenced by Reggio Emilia school practices, especially belief in children’s ability; attentive listening to children’s ideas; collaborative small-group projects including the teacher; the use of a well-designed environment as a third teacher;

extensive use of various materials as vehicles for children to express and reformulate ideas; and documentation.

Teachers wanting to raise children’s environmental awareness can use a fish, a plant, an insect, a book, an environmentally focused local event, or many other things. Wherever they start, teachers should allow plenty of time for conversation and should use the children’s own reactions, comments, and questions as the basis for what they do next.

The interconnectedness of everything on our planet dovetails with a teaching approach based on collaboration and a theory of learning based on relationships. In this case the children’s interest in the life and death of a goldfish enabled the teacher to arouse their concern for the well-being of the environment and to help the children think and act in ecologically sound ways.

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