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What am I? I am the often neglected component of language arts. I am a complex process that involves constructing meaning. I am an active and even interactive process. Response is one of my essential features. At one time I was considered passive. I am not reading, writing, or speaking. I am listening.

Throughout the school day, children are asked to listen. In fact, listening often dominates classroom time. Unfortunately, little research has focused on listening since the 1950s and 1960s (Pearson and Fielding, 1982; Strother, 1987). Nor has listening received substantial attention in textbooks and professional journals, even though educators believe that listening is important for the development of oral language, reading and writing. The emphasis on reading and writing has crowded out attention to listening (Pinnell and Jaggar, 1991). It is our belief that listening deserves to receive attention of teachers and researchers as a necessary, integrated part of the learning process.

To insure that active, purposive listening becomes an integral part of the learning process, teachers should plan carefully to encourage active listening. Plans should include experiences where children are required to listen not only to the teacher but also each other. In this article we describe a
listening experience that was part of a first grade science unit about the earth. It was designed to facilitate active listening within the context of content learning. The listening experience integrates science content, oral reading of a tradebook, and components of a Structured Listening Activity (SLA) to promote active listening and learning.

The listening experience described here included all the components of a Structured Listening Activity (Choate and Rakes, 1987). These components include: 1) activating and building background knowledge; 2) setting a purpose for listening; 3) reading aloud by the teacher while highlighting visuals and encouraging students' predictions; 4) asking questions during and after reading; and 5) summarizing the story. These components were chosen by Choate and Rakes because they reflect previously established good practice for teaching comprehension. Although we used all the components of an SLA in the listening experience, we did not view the components as steps in an ordered procedure. Rather, we found that it was useful to think of the components as elements that should be included in the listening experience. Therefore, we used components of the SLA in a flexible way, at appropriate times and places in the lesson rather than in an ordered sequence; sometimes the components were used more than once. In addition, at the end of the listening experience, activities were provided for students to become actively involved with the concepts they learned through listening. It has been proposed that active involvement after listening promotes listening comprehension (Pinnell and Jaggar, 1991).

The teacher and students
Tamara Paulos, an experienced elementary school teacher, planned the listening experience described below
to demonstrate an SLA to her peers in a graduate level content area reading course. Because she also wanted to use the lesson in her first grade classroom, she planned the listening experience with her students in mind. The students in Tamara’s classroom were children of varying abilities, including those served in the gifted program and in special education.

The tradebook

Although there are a number of tradebooks we could have used to integrate listening and science content, we chose *The Magic School Bus at the Waterworks* by Joanna Cole (1986), for three reasons. First, it fulfills many of the characteristics described by Elley (1989) as important for a read aloud book. The book is novel, humorous and includes elements of conflict, surprise and action; the characters are easy for students to identify with; and the plot is easy to follow. Second, the story is coherent, an important element for listening comprehension (Pinnell and Jaggar, 1991). Researchers have found that texts with coherent structures are easier to remember than those which simply present a string of facts. Third, the book extends information presented in chapters from the first grade science book about the earth and weather and this helps students understand the connection between the two chapters. The content of the book was also consistent with the state science curriculum for first grade.

In the *Magic School Bus* books content information is skillfully blended into a humorous fictional story. The bizarre teacher, Ms. Frizzle, plans special field trips for her class. A magic school bus takes students to very unusual places (e.g., through the waterworks, inside the earth) depending on what Ms. Frizzle’s class is studying. The *Magic School Bus at the Waterworks* focuses on two major concepts: the
water cycle and how water is purified and travels to homes. In the book, these concepts are explained as the magic bus evaporates into the air, and there children shrink and travel in raindrops from a stream to a reservoir, through various water treatment areas, and into the pipes that lead to the school. The children arrive back at school through faucets when someone turns on the water in the restroom.

The listening experience

The remainder of this article describes the listening experience that was planned to facilitate listening and learning of science concepts related to the water cycle, how water is purified, and how it gets to people's homes. First we will describe the unit to give the reader a sense of the context of the listening experience. Then we will discuss the elements of the listening experience as they relate to the components of a Structured Listening Activity. Excerpts from the lesson dialogue are used to illustrate students' responses during the lesson and provide evidence that they listened and learned from the teacher and from each other.

The unit. The general topic of the unit was the earth. In this unit students studied about concepts such as the layers of the earth, oceans, mountains, the weather, and the water cycle. Tamara used various tradebooks and reference books at varying reading levels to build students' knowledge about these concepts. Sometimes she read the books orally and other times she used the pictures and diagrams from the books to enrich students' knowledge. To assess students' understanding of the concepts, they drew pictures and discussed them.

Structured Listening Activity. The focus of the listening experience was on the water cycle, how water is purified, and how it gets to people's homes. These concepts
are rather complex and could be somewhat overwhelming, and perhaps even meaningless, if not taught in an appropriate manner. Building students' background knowledge, one component of an SLA, is extremely important when concepts are complex and if students are expected to learn as they listen. Tamara prepared students for the content of this listening experience well before the lesson described here. She structured the unit so that students would have some knowledge about the layers of the earth, oceans, mountains, weather and the water cycle. With this background knowledge, students were prepared to learn related concepts.

Activating students' background knowledge, another component of an SLA, is also important in enabling students to learn new concepts through listening. Tamara carefully built students' background knowledge about the earth and the water cycle during earlier parts of the unit. To help students make connections with their background knowledge, she knew it was important to activate students' knowledge about the concept before she read Magic School Bus at the Waterworks. Tamara accomplished this by asking students to recall the steps in the water cycle. As students offered information, Tamara drew the water cycle on the chalkboard. This experience not only activated students' background knowledge about the water cycle but the drawing also provided a frame of reference for students as they listened to the story. They could relate information in the book to the different parts of the water cycle.

In addition to activating background knowledge about the content of the book, Tamara activated students' knowledge about the structure and format of the Magic School Bus books. As she introduced the waterworks book, she reminded the class of the Magic School Bus Inside the Earth
(Cole, 1987) which she had read earlier in the unit. Tamara compared the format of the two books and told students that she would only read the story (and not the conversation bubbles or the fact sheets). Activating students' background knowledge about the format of the book helped the class listen more effectively as she read the book.

Two other components of an SLA are setting a purpose for listening and reading aloud. Setting a purpose for listening is essential if students are expected to learn from listening. The water cycle is explained in the first part of the *Magic School Bus at the Waterworks*. To set the purpose for listening to this part of the book, Tamara asked the class to listen for information about the water cycle. She did not simply tell them the purpose for listening once, but repeated the purpose several times, in different ways, before she read. Tamara continued using components of an SLA as she read the book aloud and highlighted the illustrations to help students make the connection between the parts of the water cycle and the magic school bus' journey. When she came to the part of the book where the bus evaporated into the air, two students commented (without being prompted by the teacher) that "the bus was going through the water cycle" and "it was evaporating." It was obvious that giving students a purpose for listening helped them focus on the main points in the book and facilitated listening.

After Tamara finished reading the first part of the book about the water cycle, she reviewed the concept to make sure all students made the connection between the parts of the water cycle and the story. To review she included questioning and summarizing, two components of an SLA. She questioned students about what happened as the bus traveled through the water cycle. The questions, in turn, led students to summarize the story. To help students clarify
what they remembered about how the bus went through the water cycle, Tamara referred to the book's illustrations and to the drawing of the water cycle on the chalkboard.

The dialogue below illustrates what students remembered from listening to the book and that they achieved their purpose for listening. It also demonstrates how the teacher uses the illustrations in the book to help children verify their recollection of the school bus moving through the water cycle. The dialogue reveals that students listen to the teacher and to each other. At one point in the dialogue, one student disagrees with another about what happened in the story. The dialogue also illustrates how the teacher encourages students to consider each other's responses. She repeats their responses and uses their ideas to form new questions. Finally, the dialogue illustrates how the teacher uses questions to review the concepts from the book and uses scaffolding to help students summarize the story.

Teacher: Did you see the water cycle?
Students: Yes.
Teacher: Where do you remember that it began in the story? Let's go back to the beginning. Where did it start?
Kristen: They were riding on the magic bus.
Teacher: Okay. Someone add on to that. What happened next?
Clay: They landed on a cloud and started to fall down into the water.
Teacher: Okay, let's go there. (She turned back to the page in the book where the bus went into the air.) They're on a school bus. Clay says next they landed on a cloud.
Cory: No.
Teacher: No? What, Cory?
Cory: It (the bus) evaporated. (The illustration showed the bus moving into the air.)
Teacher: Do you all agree that they (students on the bus) are evaporating?
Students: Yes.
Teacher: OK. Do you see the sun? Do you see the steamy marks going up into the air? (She pointed to the picture that illustrated the sun played a part in evaporation.) And then...?
Clay: They are in the cloud and they fall down in the raindrops.
Teacher: They're in the cloud. Erica, what happens after that?
Erica: They're shrinking.
Teacher: What are they becoming?
Stephanie: Little.
Teacher: Little.
Stephanie: And raindrops.
Teacher: What's going to happen next in the water cycle?
Paige: They're going to go to a waterfall.
Teacher: It looks like a waterfall, doesn't it? (The illustration depicted a stream flowing down the side of the mountain.)
Teacher: Does anybody remember what they're traveling down?
Students: Mountain.
Teacher: All right. They're traveling down the mountainside.
Have we completed our water circle? (Pointed to the board where she had drawn the water cycle.)
Students: Yes.
Teacher: That's the first half of the story. You did a really good job of finding the water cycle in the story.

At this point in the lesson, Tamara prepared students for the second half of the book which focused on a new topic: how water is cleaned and how it gets from lakes and rivers to people's homes. Because of the shift in emphasis, she reused three components from an SLA to facilitate listening and learning. She set a new purpose for listening by asking students to make predictions about how water gets to their houses. The predictions also served to activate students' background knowledge.

The dialogue below reflects students' predictions about how water gets from lakes and rivers to people's homes. Students' comments reveal that they listen to each other. They use each other's ideas as they make new predictions about how water gets to people's houses. The dialogue also illustrates that students refer to information they learned earlier in the unit and from their personal experiences outside school. At the end of the dialogue, the teacher uses students' remarks to direct their ideas from
how the water gets to homes to the fact that water needs to be cleaned before it gets to people's homes.

Clay: The pipe is underground and it goes to your house and it has a hole in it.
Teacher: How do you know that?
Clay: I read it in the earth book. (Refers to one of the books introduced earlier in the unit.)
Cory: There's a pipe underground that goes to the river. (Builds on Clay's comment and adds information from his background knowledge.)
Jaime: Sometimes ducks live at the river. (Adds information from personal experience and builds on Cory's comment.)
Kristen: Sometimes fish might get in the water. (Branches off of Jaime's comment and adds an idea from personal experience.)
Teacher: Does a fish ever come out in your glass of water? (Uses students' comments to direct students' thinking toward water purification.)
Students: NO! (At this point, several students suggest that something cleans the water before they drink it.)

The discussion that resulted from students' predictions about how water gets to people's homes served to activate students' background knowledge and to arouse curiosity so that students wanted to listen to the rest of the story. At the same time, the purpose for listening to the second half of the book (i.e., how water is cleaned and how it gets to homes) was introduced.

The last half of the book presents six new key concepts represented by unfamiliar vocabulary: reservoir, mixing basin, settling basin, sand and gravel filter, storage tank, and water mains. Because these concepts were unfamiliar to the students and were rather complex, Tamara felt an introduction to the concepts would help students understand more of what they heard. To do this, she decided to use a component of the SLA that she had included before: *build and activate students' background knowledge*. Tamara used a discussion that included ideas from students' background knowledge, picture cards with enlarged illustrations...
duplicated from the book, and mini-demonstrations and activities to build and activate background knowledge. For example, the class participated in an activity based on students' existing knowledge of the word *settle* to suggest what happens in a settling basin. Tamara referred students to what they knew about the word *settle* when she asked them to settle down in the classroom. To illustrate, the students stood up, moved around, and talked the way they do before she asks them to settle down. When she said "settle down" they sat down quietly. Then the class discussed what happened when they settled down and what they thought would happen in the *settling basin*. (Tamara chose to introduce the key concepts and build background knowledge before she continued reading the book because of the students' lack of familiarity with the concepts and their complexity. However, the introduction of the concepts could have been done as she read a story.)

Before reading the rest of the book, Tamara gave students a *purpose to listen* (an SLA component), which made use of the picture cards of the key concepts. (Again, she used a component of the SLA, *pictorial clues*, to enhance students' listening and learning.) She directed the class to listen to find out what happened to the water in each of the places represented in the pictures (e.g., *reservoir, mixing basin*). Tamara gave the cards to students and asked them to raise the cards (and their hands if they did not have a card) when they heard one of the new words illustrated on the cards. Students listened actively as Tamara read the last half of the book because their curiosity was aroused when they made predictions, they had a purpose for listening, and they had to respond actively as they heard the words in the story.
After Tamara finished reading the book, she returned to the questioning component of the SLA. She asked questions to determine if students understood each of the new concepts introduced in the second half of the book. Students described each concept and used the picture cards for clues. Below are excerpts from the lesson that illustrate children's understanding of the concepts. Although it may appear that students merely recall what happens in the various places where water is cleaned, we believe that the complexity of the concepts did not lend themselves to rote learning. Evidence from the dialogue reveals that students made their own links with and used their own words to explain the concepts. The dialogue also provides evidence that students listened during the introduction of the key concepts because they included answers to Tamara's questions that were not mentioned in the book.

**Teacher:** Can you show me how the water gets to our houses? What do you know about a reservoir?

*Cory:* It's a deep hole. It's manmade. [The idea that a reservoir is a deep hole was introduced in the book; the idea that it is manmade was introduced by Tamara and not by the book. The student connected what he learned from listening to the book and from Tamara's introduction.]

**Teacher:** What do you know about the mixing basin?

*Paige:* It has those little white balls — alum. (Alum was mentioned briefly in the book.)

**Teacher:** What is the job of alum? (An idea discussed in the book.)

*Kristen:* The alum drops little balls... it mixes.

(To provide scaffolding so students could relate more ideas to the word *alum*, Tamara reminded students of the demonstration she used to illustrate what happens in a mixing basin.)

*Kellan:* It (alum) collects all the dirt. [The book discussed the fact that dirt sticks to alum and forms globs. Kellan used his own words to describe alum's job in the mixing basin.]

**Teacher:** What happens in the settling basin? Remember what (the activity) we did in class. (Refers to the "settling down" activity described above.)

*Kristen:* It's where alum goes to the bottom...

**Teacher:** What is a sand and gravel filter?
Allison: Where all the sand and gravel stay and the water goes.
[In other words, the water flows through the sand and gravel filter. This concept was discussed in the book and demonstrated during the background building component of the listening experience. Allison uses her own words to explain the concept.]
Teacher: What is a storage tank?
Mikey: It keeps the water inside.
Teacher: Until?
Students: Someone uses it.
Teacher: What do you know about water mains?
Clay: They go up in buildings and come out in faucets.

At this point in the lesson, it was time for the students to demonstrate what they learned from listening to the last half of the book. Could students remember how water gets to their homes, their purpose for listening? Tamara asked students to put the picture cards in sequence to summarize the second half of the book. As they decided what came first, second and third, students holding the appropriate picture cards moved to the front of the class. First students summarized by explaining that water was in the reservoir and then went to the mixing basin. Then they hypothesized that either the sand and gravel filter or the settling basin was the next place that water traveled. However, they were not sure whether the water went to the filter or the basin first. Cody suggested that the sand and gravel filter could not come before the settling basin. Building upon this suggestion, Tamara led the children to discover the solution to their problem by asking questions, pointing out illustrations in the book, and referring to the demonstrations she used during the background building component of the lesson. The following dialogue represents the discussion that ensued as children solved their problem.

Teacher: Why can't the sand and gravel filter go before the settling basin? [She pointed to the picture card to provide students with clues to help them solve the problem they confronted.]
Cody: There's no alum in the sand and gravel picture.
Jaime: It (water) goes through there (pipe) and then...
Tamara turned to the picture of the mixing basin in the book and suggested that they think back to the mixing basin and consider what happened there. Some students referred to the " globs" in the mixing basin.

Cassie: It (the water) would be dirty. It (the globs of dirt and alum) would have to settle.  
Dan: One (picture card) has a pipe at the bottom and the other has a pipe at the top.  
Teacher: What would go out at the top?  
Students: Clean water.

The students concluded from the discussion and from the clues in the illustrations that the cleaner water would be in the sand and gravel filter. Therefore, they decided that the water went to the settling basin first and then went through the filter. (Without a clear understanding of the concepts illustrated in the pictures, the students would have been less likely to have solved this problem.) Students agreed about the sequence of the next two picture cards, the storage tank and water mains. Finally, students confirmed the sequence of the cards by matching them with the illustration on the last page of the book that showed the places water is cleaned and how it travels to homes. Students were successful with the sequencing activity because the lesson was carefully planned to facilitate listening and learning.

Extending and evaluating a listening experience

Although Tamara had finished reading the book and students had summarized it, that was not the end of students' experience with the key concepts from this book. Because research (McKeown, Beck, Omanson and Pople, 1985) has shown that students need multiple and varied encounters with concepts for learning to occur and because listening comprehension is enhanced when active involvement follows listening (Pinnell and Jaggar, 1991), Tamara provided situations so students would continue using the concepts in the Magic School Bus at the Waterworks for
several weeks. She put numbers (indicating sequence) on the back of the picture cards and placed them in a learning center. She told students the cards and a classroom set of the book would be in the center, and they could put the cards in sequence using the book to help them, when necessary. She also suggested that they could use the cards to write their own stories about how water is cleaned and travels to people's homes.

During the next three week period, students went to the learning center and manipulated the picture cards. A number of self-initiated activities ensued. Students put the cards in order and checked their work by using the numbers on the cards and/or by reading the book. They also put the cards in order and drew their own renditions of the water purification system. Some students labeled their drawings with the vocabulary they learned from listening to the story. They read and reread the book individually and to each other. In one instance, two students compared the *Magic School Bus Inside the Earth* (used earlier in the unit) and the *Magic School Bus at the Waterworks*. They searched for comparisons and discussed their findings.

During the second week of this same period, Tamara planned a drawing activity to evaluate students' understanding of the concepts they learned from listening to the story and participating in the extension activities. First she divided the chalkboard into seven sections. Students discussed how water gets to homes beginning with the water cycle without referring to the book or the picture cards. As they named and discussed the seven key concepts from the book, Tamara labeled each section of the board with one concept. Students volunteered to be experts for the concept they understood best and drew a picture illustrating that concept. Each group of experts drew their rough drafts
of the concepts on the chalkboard. When they were satisfied with their drawings, they drew a picture that represented their concept on one section of a large piece of paper and labeled the concept. When all the drawings were complete, the class had constructed a mural that summarized what they knew about the water cycle, the water purification system, and how water gets to homes. The class mural illustrated what students learned from the experiences that were based primarily on listening to the *Magic School Bus at the Waterworks*. Tamara was able to evaluate students' understanding of the concepts from their drawings.

**Summary and recommendations**

This article describes a listening experience that was designed specifically to facilitate listening by integrating it within the context of a science lesson. The teacher planned the experience so that the children were not simply encouraged to listen. Rather, students were provided with a situation that enabled them to listen effectively.

The teacher used components of the Structured Listening Activity to enable students to listen and learn. The teacher developed a unit, sequenced so that previous knowledge was used to build new understandings. These understandings became background knowledge for the concepts students would learn later in the unit. Tradebooks, reference books, diagrams and pictures were used to build background knowledge. The teacher activated students' background knowledge about key concepts in the *Magic School Bus at the Waterworks* by using a drawing that illustrated the parts of the water cycle and by asking students to make predictions before she read to them. Students' background knowledge was also activated by the teacher's questions. The questions served as scaffolding to help
students relate their knowledge to concepts in the book. The teacher also used the illustrations in the book as clues to enhance students' understanding of the difficult concepts presented in the book. Questions were used to help students review and summarize what they learned. Finally, the teacher provided opportunities for students to become actively involved with the concepts after the listening experience was completed so that listening comprehension would be enhanced.

From this illustration, it is easy to see that Tamara used many different ways to enable students to listen effectively and, consequently, learn. It is unfortunate that listening is typically thought of as the responsibility of the listener. We suggest that if students do not listen effectively, teachers need to reevaluate the experiences they provide for students in which listening is an essential component. The questions listed below will help teachers plan lessons in which listening is of prime importance.

Do students have necessary information (background knowledge, purpose for listening) that will enable them to learn new concepts that are presented orally?
What kinds of learning experiences can I provide to help build students' background knowledge?
How can I sequence those experiences so that students can use their new knowledge as they listen?
What strategies would be effective for activating students' background knowledge?
What kinds of questions would be appropriate to facilitate listening?
When would be the best time to ask questions?
What clues are available in a book (e.g., illustrations, context clues) to help students learn as they listen?
What kinds of activities could be used to summarize what students learn from listening?
What kinds of activities can I use to get students actively involved with concepts after listening is completed?
In the listening experience described in this article, listening was facilitated because science content was presented in an interesting story, students' background knowledge was activated, pictures were used, purposes were set, predictions were made, and active involvement (discussing, summarizing, writing, drawing) was allowed and encouraged. In effect, listening was an integral part of the entire learning experience. If any of the components of the experience had been omitted, listening and learning would have been less effective. Because we believe that it is the teacher's responsibility to provide situations in which listening is facilitated, we recommend that teachers use components of a Structured Listening Activity to plan experiences that will promote listening and learning. If teachers expect students to listen effectively, they can not merely implore students to listen but must provide conditions that enable students to listen.

References

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