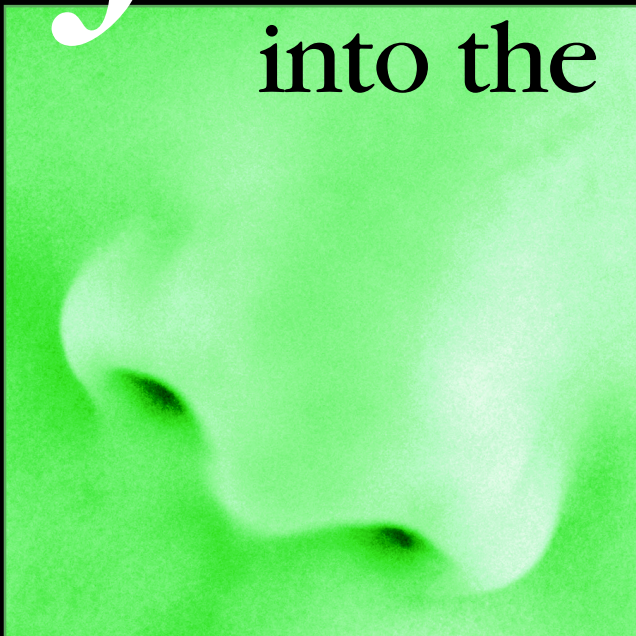


Journey into the Five Senses



*Young children experience
authentic science inquiry as
they investigate their
questions about the senses.*

By Susan McWilliams



I admit to silently groaning when the teacher who agreed to participate in my study informed me that her class was embarking on a five senses project. I quickly discovered that my attitude was completely unfounded. At the time, I was a doctoral student at the University of Colorado at Denver researching inquiry teaching and learning. Neither my graduate coursework nor my experiences as a primary grade teacher prepared me for the variety of participants who collaborated with the teacher and her K–12 students during their four-week-long inquiry journeys into the five senses.

I'd like to share this inspiring project with you.

A Collaborative School Culture

By involving various school colleagues, a parent, a community member, and a museum, the teacher facilitated a collaborative approach to learning in her classroom.

From the outset, the teacher demonstrated that authentic science inquiry began with students. A few days before I first visited the classroom, the teacher read students a book about Helen Keller. The children were intrigued by Keller's experiences and began wondering about how the eyes and ears functioned. It was this curiosity that led the teacher to conduct the inquiry-based project on the five senses.

The development of conceptual understanding of the senses was not linear in this classroom. The project began with a study of the eyes, progressed toward the senses of touch and hearing, moved back to the eyes, addressed smelling and tasting, and then examined hearing again.

Throughout the study, children were provided with opportunities for further sense explorations during "choice time" (in her class it was during students' morning arrival time). During choice time, the teacher set up open-ended activities to promote thoughtful explorations, investigation, and dialogue among students. Students chose the activity they were interested in and participated in it for as long as they liked during that time.

Inspiration for Inquiry

Their project began with an exploration of eyes. The teacher asked students to discuss what they knew about eyes. Some of the children's statements included:

- "I know the color of my eyes. They are hazel."
- "Without eyes, you wouldn't know where you were going."
- "There's a black dot in the middle."
- "Even though eyes are important, you can still live without them."
- "Eyes are squishy."
- "Your other senses work better when you're blind."
- "Eyes are fragile."

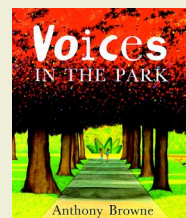
Children's Trade Books About the Five Senses



Baker, P. 1998. *My First Book of Sign*. Washington, D.C.: Kendall Green.

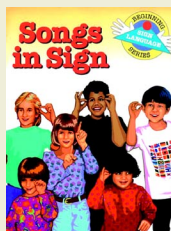
Bennett, P. 1998. *My Brain and Senses*. Parsippany, N.J.: Silver Press.

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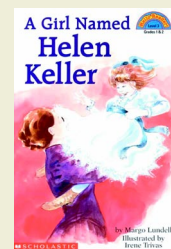
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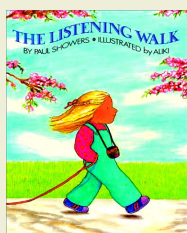
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Initially, students posed only one question on the class chart paper: "Where is the cornea?," which was important to a student whose relative had a recent corneal transplant. As the discussion continued, however, students added two more questions:

- "What makes the color of the eye?"
- "What are the pupils for?"

The teacher explained that they would find answers to these questions over the next few weeks as they learned more about the eye and the other senses.

The Eyes Have It

After the introductory discussion, students used mirrors of different sizes (floor and handheld) to observe their own and their peers' eyes. Being careful not to touch any real eyes, children squinted at themselves in mirrors, opened their eyes as wide as possible, covered one eye and then the other with their hands, and closed both eyes then opened them slowly and quickly.

Do you see that!? This student checks out his eyes during choice time—when children choose their learning activities.



PHOTOGRAPHS COURTESY OF THE AUTHOR

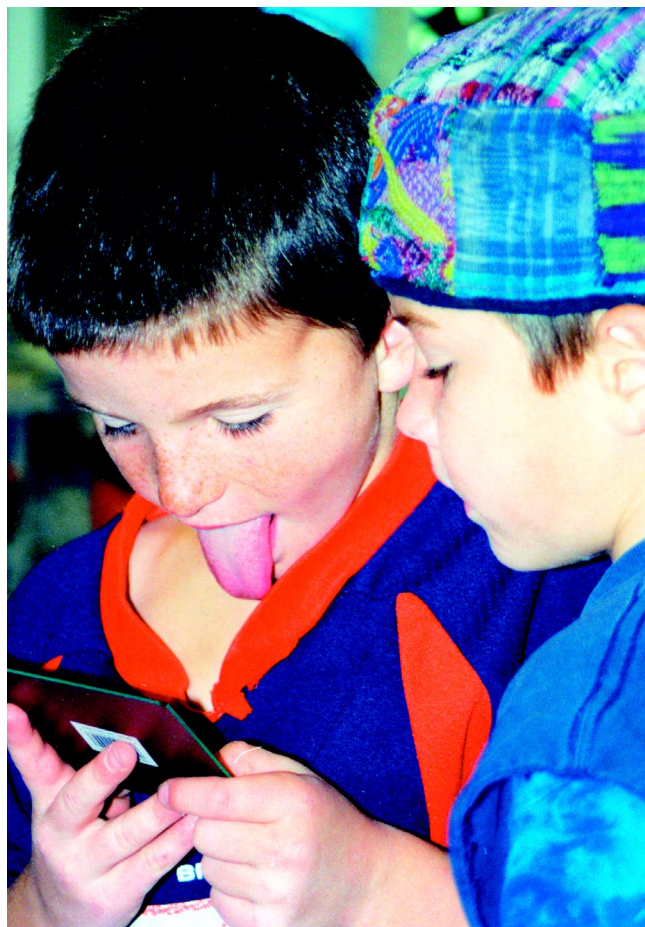
After about five minutes of exploration, the teacher encouraged students to concentrate on making "accurate" scientific observations "as real scientists do." Students observed their eyes for about 10 more minutes and then illustrated or wrote about their findings.

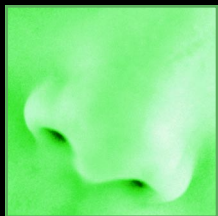
Finally, students came together "as real scientists do" to discuss what they observed. Their comments included:

- "There's a hole!"
- "That's where tears come out of and your eyes start watering."
- "Your eye has different colors. You have different colored veins."
- "Winking is with one eye. Blinking is with two eyes."
- "You have lashes on the eyes on the bottom and the top."
- "When you move your head, your eyes move."
- "People have red in the bottom (of their eyes)."

At the end of their "meeting" the teacher commended students on their interesting observations about the eyes and encouraged them to add any questions to the class chart to be explored later.

What's my tongue like? After observing tongues with mirrors, students constructed a model.





Students tried to identify the scents of cotton balls placed in plastic cups and saturated with different scents, such as almond, lemon, alcohol, banana, peppermint, vinegar, and orange.

Listening and Creating

Students learned about the sense of hearing through a collaborative school effort. The teacher and the principal conducted a language lab in the principal's office with half the class at a time. (The principal regularly schedules small groups of students in her office to support teachers and students in writing.) The teacher read *The Listening Walk* (see Children's Books about the Five Senses, page 39). Afterward, the group discussed the content and prepared to take their own listening walks outdoors.

The principal told the students, *"One of my favorite things to listen to is the crackling of leaves. I wonder if I will hear the crackling of leaves on our listening walk."*

To heighten their sense of hearing during the "listening walk," students took turns wearing a blindfold.



The group took a listening walk outdoors, and when they returned the teacher asked students to write down or illustrate their observations. During this time, the children discussed what they heard on their walk:

- *"I heard a squirrel climbing up the tree."*
- *"I heard the construction site building a house."*
- *"I heard construction and a squirrel climbing."*
- *"I heard birds 'tweet tweet' and leaves 'swish swash.'"*

As the students talked about their experiences the principal said, *"I notice that many of you are writing and spelling the word 'heard.' It's got 'ear' in the middle. Isn't that fun to look for? 'H 'ear' d.'"*

The Doctor Is In

To explore the sense of smell, the teacher asked a student's parent who was a medical doctor to visit the classroom and lead in-depth sensory explorations about smell. To begin the visit, Dr. Dan drew a really big profile of a nose on chart paper to which children reacted with a collective *"whoa!"* He discussed the various parts of the nose and their functions and then labeled his drawing.

Next, students conducted active smelling investigations with Dr. Dan and the teacher. In this exploration, students tried to identify the scents of cotton balls placed in plastic cups and saturated with different scents, such as almond, lemon, alcohol, banana, peppermint, vinegar, and orange. Students recorded their observations as they investigated the scents.

Afterward, they met as a group to share and discuss what they observed. Dr. Dan asked, "What did we learn?" One child quickly responded, "We learned that our nose can tell what lemon is and what peppermint is." Dr. Dan agreed, and then directed students' attention to the large nose diagram they had drawn earlier to talk with students about how the nose actually works. Since many students were interested in "nasal secretions," Dr. Dan also discussed that nasal secretions help the nose to stay clean by keeping bacteria out.

Dr. Dan visited the classroom several more times during the sense study—to help students learn about hearing and tasting. When he returned to school to teach about hearing, Dr. Dan illustrated a large ear and its main

components. Using a keyboard he brought with him, he told students about how the ear hears and demonstrated pitch and loudness variations.

In the taste session, students were asked to differentiate salt from sugar by sight, touch, and lastly taste in order to solve the problem accurately. The tasting experience led to an in-depth study of the tongue with Dr. Dan.

Students were asked to notice where on the tongue they tasted the sugar and the salt. Near the end of the session, a student asked, "What does the rest of the tongue taste? The teacher pulled out a book on tasting and the tongue and opened it to a diagram showing the parts of the tongue. Together they learned that four main tastes—sweetness, sourness, saltiness, and bitterness—are discerned by taste buds located in specific areas on the tongue. Students used nonfiction books about tasting (see *Children's Books about the Five Senses*, page 39) to find out more about the sense of taste.

As they had done with their eyes, students also used mirrors to observe their tongues up close. Students observed their tongues for about 10 minutes and shared their observations as a class. Later, students created a large model of a tongue with foam board, bubble wrap (for the taste buds), paint, labels, and pushpins.

Revisiting Eyesight

To answer students' questions about the eye posed at the start of the project, the teacher invited a local ophthalmologist to the classroom. He brought a model of an eye, 12 cm in diameter, to introduce the different parts of the eye and discuss how the eye works. During his visit, Dr. Larry answered children's questions about eyes, including those from the chart paper and new ones that came up during the visit.

The next day, during "Language Lab," the teacher taught students about the structure of a letter and reviewed the previous day's visit with Dr. Larry. The



A visiting doctor illustrated the tongue and described how the different tastes are detected on different areas of the tongue.

teacher recorded students' statements about what Dr. Larry taught them and ended the letter lesson by making a list of the vocabulary words: *pupil*, *cornea*, *iris*, *retina*, *optic nerve*, and *eye* and asking students to write or illustrate a thank-you note to Dr. Larry.

The following list is one group's reflection on what Dr. Larry taught them:

- "The eye is important."
- "Pupils are holes."
- "Eyes have six muscles. Two move the eye up and down, two move side to side, and two in the corners."
- "The cornea is the clear part over the eye. The pupil is in the middle. The iris is the color part."

When students finished their letters, they met as a group for sharing. Some students chose to read their letters to their classmates.

When he left, Dr. Larry lent the teacher the model of the eye for students' further explorations and reference. The children often referred to the model when they and their teacher read nonfiction literature about the eye.



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Touch This!

The sense of touch was predominantly addressed during choice time. One morning, students made a collage using various media of differing textures. Students chose from wire, velvet, sandpaper, corrugated cardboard, sponges, steel wool, fake fur, and many other media. While working, students talked with each other informally about what the textures reminded them of in their experiences and were prompted with questions from the teacher, such as “How does that feel?” “Is this smooth or rough?”

To further explore the sense of touch, the students and the teacher created two “feeling boxes” during choice time. “Feeling boxes” were boxes with a hole cut in it just large enough for a hand, but not large enough that the contents of the box were visible. Students decorated the boxes, and, each day, the teacher changed the object in the boxes. Many times the feeling boxes became the first focus of attention in the morning.

To the Museum

To cap off the project, the teacher planned a trip to the Denver Museum of Nature and Science. Students were divided into two groups and attended informational sessions presented by the Hall of Life Health Education Center. Younger students (K–1) learned about how the ears and eyes function by watching a demonstration with large take-apart ear and eye models, examined a Braille book, observed sound waves made with a tuning fork placed in water, tested their taste buds, and performed various smell and touch experiments.

The second-grade students observed the dissection of a cow’s eye, experienced demonstrations of sound waves, and participated in an examination of the three tiny bones in the ear. All of the students were captivated during the field trip and returned with information to share.

A Sense of Reflection

This project demonstrated how a rather ordinary topic—the study of the five senses—can become a dynamic and meaningful inquiry when a teacher takes steps to extend learning beyond the school to the community and its resources.

During this five senses project, the teacher nurtured her students’ curiosity through several means: revisiting facets of the topic in further depth; providing opportunities for children to “choose” explorations and investigations related to the study; giving children the support to ask questions and find out information; and maintaining resources such as nonfiction literature, tools, and models.

The teacher believed that building a collaborative partnership with members in the community would help her students become completely involved with the topic of study—and it did. When I interviewed students for preassessment at the beginning of the

Connecting to the Standards

This article relates to the following National Science Education Standards (NRC 1996):

Grades K–4

Content Standards:

Standard A: Science as Inquiry

- Abilities to do scientific inquiry
- Understanding about scientific inquiry

Standard C: Life Science

- The characteristics of organisms

Standard F: Science in Personal and Social Perspectives

- Personal health

unit, only two could list the five senses accurately. By the end of the project, the students not only told me what the five senses were, they also elaborated with interesting facts!

Including experts and field trips in the project also helped students begin to see that numerous sources and experiences are required for learning about a topic of study. In this project, the teacher not only fostered inquiry learning but also modeled authentic professional collaboration and strengthened a community partnership composed of educators, professionals, parents, and learners. ■

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Resources

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