CD-173 Class Observations:

Activities on Seeing and Hearing

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December 9, 2003

Our senses are our most fundamental learning tools. Through our earliest experiences hearing, seeing, tasting, smelling, and touching, we begin to construct an understanding of the world around us and learn the language of forms on which our knowledge is built [1]. Not surprisingly, some of the first experiments that we conduct as *young scientists* have to do with our senses. When a child presses her hands to the sides of her head and yells, "I can't hear you," she knows from previous experience that she can make the world more quiet by covering her ears. This paper describes two activities conducted in a second grade classroom that were designed to encourage children to explore and reflect on their sense of sight and hearing through playful experimentation.

Activity 1: Eyesight

In the first activity, the teacher starts by reading aloud from a book about our eyes and our sense of sight.

Teacher: "...the light enters through our pupil ..."

Dino: You see lights and shapes when you close your eyes!

Teacher: That's right. (*reading again*) "... the light hits your retina and sends messages to your brain ..."

Ralph: Do you know your eyes get bigger when it gets dark!

Teacher: That's right. Do you know why?

Emily: So that you can see better.

Teacher: Yes. It's so that more light can come into your eyes. How do you go to the bathroom at night when it's very dark in your room?

Children: *Lots of talking ...*

Jesus: I start to walk and then I bang my head. (*laughing*) I found my way around by banging my head!

Ralph: First I feel around my bed very slowly. And then I move my hands along the wall until I can feel the door.

Teacher: That's a good idea. Sometimes we have to rely on other senses than our eyes. Maybe we can *feel* the wall or maybe we can *smell* food if we want to go to the kitchen and get a snack. Now we're going to try a game. I want everyone to take off one of their shoes. Take some time to get to know your shoe by feeling different parts of it. Try to take a mental picture of your shoe.

Children: *All feel their shoes.*

Teacher: Maybe you can see how it smells.

Dino: My shoe smells like a rotten egg! Ugh!

Teacher: Ok, now I want everyone to put their shoe in the middle of the circle in a big pile. We're going to take turns with a blindfold on, so that you can't see anything. When it's your turn, I want you to try to find your shoe without using your eyesight. Margaret, you get to go first.

Margaret: (*picks one shoe after patting and stroking several*) Got it! My shoe had velvet on it.

. . . other children take their turns. . .

Emily: I found my shoe by feeling the laces.

Ishmael: (*doesn't seem to like the game and peeks under the blindfold*)

Dino: These are too small. Mine was the biggest kid shoe.

Jesus: (*finds his shoe by feeling the sole*)

On one level the teacher uses this activity to familiarize the children with some of the scientific vocabulary relating to eyesight such as *pupil*, *retina*, and *lens*. But she also encourages the children to build a conscious awareness of their senses by staging a situation in which they are deprived of one of their principle means of perception. The comments and answers that the children offer throughout the lesson indicate that they had experimented some with eyesight and sensory deprivation before. The teacher tries to build on these observations by offering brief scientific explanations. Overall, This activity seemed well-prepared and well-executed. It was fun for the children and held their attention for several minutes. However, most of the students were able to find their shoes very quickly when blindfolded, and a few seemed bored with the activity.

Activity 2: Sounds All Around

In this activity, the teacher engages the students in a variety of experiments to help broaden their understanding of sounds and hearing.

Teacher: I'm going to read a book about our sense of (*puts her hand to her ear*) . . .

Emily: Sound!

Dino: Hear! . . . Hearing!

Teacher: That's right. Now I'm going to read a book about our sense of hearing. . . (*she begins to read in sign language without making any sound*)

Jesus: Hey. We can't HEAR you.

Dino: What language are you SPEAK-ING?

Teacher: I was speaking in sign language. Do you remember when we talked about sign language? Some people can understand sign language even though there isn't any sound. Why don't my hands make any sound? Try this: Say "ahhh" and feel your throat at the same time. (*puts a finger on her throat*)

Children: AHHHH!

Teacher: Ok. Ok. What does it feel like?

Margaret: It's vib- vibrating.

Teacher: That's right. Vibrations make sound. Now I'm going to read from a book called *Sounds All Around*. ". . . Snap your fingers. Clap your hands. Sing. Talk. Hum."

Children: (*make various noises with the book*)

Teacher: ". . . our vocal chords vibrate and make waves called. . . "

Ann: Sound waves!

Teacher: ". . . when you are quiet and your vocal chords aren't vibrating, there is no sound. . . Inside our ears there are tiny bones that vibrate when we hear sound. Did you know that snakes doesn't have ears? They can *hear* by feeling vibrations through the ground."

Dino: Hey! You're skipping pages.

Teacher: Now we're going to try different experiments with sound. We're going to put our ears on the ground and listen to what we can hear. We're also going to pluck

rubber bands to hear the sounds. And we're going to tap glasses with water in them to feel, hear, and see the vibrations.

children divide into groups and start the activities

Emily: (*plucking rubber band guitar*) Hey, I can see the vibration.

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Here, as in the last lesson, the teacher familiarizes the children with some of the scientific vocabulary regarding sound such as *vibrations*, *sound waves*, and *ear drums*. By associating different phenomena such as snapping, clapping, humming, and singing she helps to broaden the students' definitions of sounds and hearing. The experiments also encourage a sort of epistemological thinking about how we perceive sound. First, by speaking silently in sign language, the teacher both demonstrates how much we depend on our hearing and provides an example of how some people live without it. Then, by showing how we can perceive sound through our other senses (seeing rubber bands and feeling vocal chords), she empowers the students to think about the physical principles that make hearing possible. Although the children had some trouble concentrating because it was the end of the day, they seemed to have a few inspirational breakthroughs. Many of the children were surprised that they could feel sound coming out of their own mouths, and at least one of them was very excited that she could see the vibrations of the rubber bands.

References

[1] David Elkind. Educating young children in math, science, and technology. In *Dialogue on Early Childhood Science, Mathematics, and Technology Education*. American Association for the Advancement of Science, 1999.