



# EXPEDITIONARY LEARNING

## Science Talks

### An Instructional Practice That Promotes Inquiry and Collaboration

*“The point at which wonder moves hungrily into a search for knowledge....”*

—Based on work by Karen Gallas in *Talking Their Way into Science: Hearing Children’s Questions and Theories, Responding with Curricula* (New York: Teachers College Press, 1995)

#### Description and Rationale

Science Talks are discussions about big questions. They are appropriate for any grade level, but they are particularly useful for elementary school. Like a Socratic Seminar, Science Talks deal with provocative questions, often posed by the children themselves. Some recent Science Talks at Anser Charter School include: “What makes a bird a bird?” “How do trees stand up?” and “How do plants grow from bulbs?” The questions often relate directly to the expedition topic (e.g., birds, trees, or plants and butterflies).

Science Talks provide space for students to collectively theorize, to build on one another’s ideas, to work out inchoate thoughts, and to learn about scientific discourse. Most importantly, they allow all students to do exactly what scientists do: think about, wonder about, and talk about how things work, the origins of phenomena, and the essence of things. The teacher’s task during a Talk is to listen very carefully and to follow student thinking. These Talks provide a window on student thinking that can help teachers figure out what students really know and what their misconceptions are. Armed with this insight, teachers can better plan hands-on activities and experiments. Students become more motivated to do these activities because they are truly on a “need to know” basis. For instance, in the Talk on how plants grow from bulbs, one first-grade student lamented, “Okay, I know that plants need sunlight, water, and nutrients from soil in order to grow, but I don’t understand how the plants use those things. How does sunlight help a plant to grow? How does water help? How does the plant get the nutrients from the soil?” A series of experiments and activities can now be planned to address those questions. One example might be taking a stalk of celery and placing it in water colored with blue dye. The students can then observe the celery slowly turn blue as the vegetable absorbs the water. This observation will inevitably generate more questions and theories: “How does the celery stalk suck up the water?” “You’d think with gravity, that wouldn’t happen.”

Science Talks are a valuable tool for working on the culture of the classroom, as well as working on the social construction of meaning. Children sit in a circle and direct their comments to one another, not to the teacher. In fact, the teacher stays quiet and out of the way, facilitating only to make sure that students respectfully address one another and to point out when monopolizing behavior occurs. Students sense the importance of these Talks, and appreciate having their thoughts and attempts at verbalizing valued. In a good Talk, you’ll hear students saying, “I want to add to what Grace said....” Or, “I think Derek is right about one thing, but I’m not so sure about....” These norms should be explicitly addressed before a Science Talk commences, and, in Expeditionary Learning style, debriefed at the end. Here’s a short guide to doing a Science Talk:

## **Choosing the Question**

The best questions are provocative, open-ended, and admit multiple answers and theories. Often, students generate great questions for Science Talks. To hear those questions, however, means that teachers must pay close attention to students' talk during science activities, while doing field work and debriefing field work, and other opportunities during the day. Often, the "Wonder" part of a K-W-L will include great wonderings that can't be answered with a simple fact. Teachers can also generate questions based on their own wonderings. Often, as teachers study their content deeply and consider the big ideas and guiding questions for their expeditions, they will realize their own burning questions about a topic.

## **Introducing Science Talks to Students**

Gather students into a circle on the floor. Introduce the first Science Talk by discussing what scientists do. Children have theories about that, too. By saying that what we're about to do now is exactly what scientists do when they get together, you heighten the drama, value, and anticipation. Ask, "What will help us talk as scientists?" Record the children's comments, as these will become the norms for the Science Talks. If the students don't mention making sure that everyone has a chance to talk, introduce that idea, as well as how each child can ensure that he or she doesn't monopolize the conversation. Stress how each child's voice is valued and integral to the success of a Science Talk. Another good question to pose is, "How will we know that what we've said has been heard?" Children will readily talk about how they can acknowledge what's been said by repeating or rephrasing it before they go on to add their comments. This is a great place to add (if the students don't) that talking together is one way scientists build theories.

## **Conducting the Science Talk**

With young children, it is often helpful to first do a movement exercise that relates to the Science Talk. For the Talk on how plants grow, students were invited to show, with their bodies, how plants grow from bulbs. Not only does this give students a chance to move before sitting again, it also gives them a different modality in which to express themselves. Sometimes the shyer children find acting something out first helps them to verbalize during the Talk. It's helpful for teachers to record the Talks, as it's hard to catch every child's line of reasoning. Replaying the tapes later helps to make sense of what at first hearing can seem incomprehensible. Children also love hearing the tapes of Science Talks.

Kindergarteners have been known to demonstrate great stamina for these Talks. The one on trees lasted 50 minutes. A typical Talk lasts about 30 minutes. Again, the teacher must work hard at listening but not taking over. Simple comments such as, "Please direct your comments to the other children" help students know that the teacher is serious about this being a student conversation. It can be helpful for a teacher to take notes. Before the Talk begins, it's helpful to set a goal related to a Science Talk norm. For instance, "Today we're going to work on making sure everyone gets a turn to talk."

## **Debriefing the Science Talk**

The debrief should take only a couple of minutes, and should refer to the norms and goals for the Talk. Asking students how they might have an even better Science Talk will help set the goals for the next Talk.

As with the plant Talk, the logical next steps are to figure out experiments and hands-on activities that address students' questions and hypothetical answers. At this point, curriculum resources and science kits are very helpful.

### **Documentation of Student Thinking and Using the Science Talk to Inform Instructional Choices**

It's helpful to document student thinking expressed during a Talk. There are several ways to do this. One way is to transcribe the Talk and post it in the classroom. For the Talk on “What makes a bird a bird?” the teacher took the children’s ideas and made a display of flight, feathers, wings, beaks, and feet that the children explained makes a bird a bird. There was a disagreement about flightless birds—are they still birds? So, the teacher put up pictures of emus and ostriches and posed the question, “Are they birds? What makes them birds?” In this way, she promoted continued thinking about the question.