DOCUMENT RESUME

ED 410 115 SE 060 524

TITLE	A First-Grade Math Lesson with David Burchfield. School Development Library. [Multimedia.]
INSTITUTION	North Central Regional Educational Lab., Oak Brook, IL.
SPONS AGENCY	Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE	95
NOTE	59p.; The videotape component of this multimedia package is not available from ERIC.
CONTRACT	RP91002007
AVAILABLE FROM	North Central Regional Educational Laboratory, 1900 Spring Road, Suite 300, Oak Brook, IL 60521-1480; telephone: 800-356-2735.
PUB TYPE	Guides - Classroom - Teacher (052) -- Non-Print Media (100)
EDRS PRICE	MF01/PC03 Plus Postage.
DESCRIPTORS	Cooperative Learning; Educational Strategies; Evaluation; Grade 1; Learning Activities; Mathematics Instruction; Primary Education; *Problem Solving; Teaching Guides; Teaching Methods

ABSTRACT

Items in the North Central Regional Educational Laboratory's (NCREL) School Development Library series are multimedia packages consisting of print, video, audio, and CD-ROM resources designed to support educators in their efforts to improve classroom instruction. This particular set consists of a 35-minute video and a printed booklet focusing on David Burchfield, a first-grade teacher. The video of his classroom shows him using a variety of cognitive instructional practices including an emphasis on the problem-solving process, group learning, and laboratory activities during a math lesson. It is actual footage of a first-grade classroom and is divided into 16 events, each division representing a change in the activities or flow of the classroom. The text of the booklet is based on spoken comments made by various people as they watched the video. The booklet's intent is not to be a verbatim transcript, but rather to capture the viewer's reactions to the classroom. (JRH)

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ED 410 115

School Development Library

A First-Grade Math Lesson With David Burchfield

David Burchfield is a first-grade teacher. The 35-minute video of his classroom shows him using a variety of cognitive instructional practices including an emphasis on the problem-solving process, group learning, and laboratory activities during a math lesson.

NCREL

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A First-Grade Math Lesson With David Burchfield

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This publication is based on work sponsored wholly or in part by the Office of Educational Research and Improvement (OERI), Department of Education, under Contract Number RP91002007. The content of this publication does not necessarily reflect the views of OERI, the Department of Education, or any other agency of the U.S. Government.

The North Central Regional Educational Laboratory is one of ten regional educational laboratories funded by the Office of Educational Research and Improvement of the U.S. Department of Education. In addition to conventional print publications, NCREL uses computer networks, videoconferencing via satellite, and video and audio formats to reach its diverse audiences.

Acknowledgments

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NCREL's School Development Library consists of video and print resources designed to support educators in their efforts to improve classroom instruction. These materials include audiotapes, case studies, the *Pathways to School Improvement* Internet server, print guidebooks containing teacher and expert commentary, video programs and videotapes of actual classrooms, and CD-ROMs, which include both a classroom video and the guidebook in electronic format.

The classroom videos are not scripted; they provide an example of real elementary or high school instruction to be used as models or cases for educators to study. They are examples of good instruction that is consistent with established and developing content standards. These videos are designed to be used as part of an ongoing professional development program that includes the use of other classroom videos, information, and resources.

Some of this material was adapted from Strategic Teaching Framework (STF), an NCREL/IU hypermedia project, under the direction of Thomas Duffy, Professor of Instructional Systems Technology at Indiana University; Beau Fly Jones, Senior Researcher and Director of the Teaching and Learning Center at NCREL; and Randy Knuth, Director of the Center for Scaling Up at NCREL.

NCREL would like to thank Tammy Chaney, Buck Brown, and all of the staff and students of the Instructional Systems Technology Department at Indiana University at Bloomington who were involved in this project. We would also like to extend a special thanks to David Burchfield and the staff and students at Brownsville Elementary School in Crozet, Virginia, and to Diana Lambdin from Indiana University at Bloomington.

David Burchfield

Suggestions for Using the Perspectives With the Video

David Burchfield is a first-grade teacher. The 35-minute video of his classroom shows him using a variety of cognitive instructional practices including an emphasis on the problem-solving process, group learning, and laboratory activities during a math lesson.

The video is actual footage of a first-grade class filmed during January. It is divided into sixteen events, each division representing a change in the activities or flow of the classroom.

The David Burchfield Perspectives booklet is designed to be used with the David Burchfield video. The text in this booklet is based on spoken comments made by various people as they watched the accompanying video. NCREL tape-recorded, transcribed, categorized, and, in some cases, condensed these comments. This booklet's intent is not to be a verbatim transcript, but rather to capture the flavor of the viewer's reactions to the classroom. These perspectives were shared by David Burchfield, the classroom teacher; Dr. Diana Lambdin, an elementary mathematics researcher; and the NCREL/IU project team.

We suggest that you use this booklet as you view the video to add insight into the instructional methods used in the class.

Event 1 Transition to a new activity

Classroom Management

David Burchfield

NCREL/IU

The children had just come in from an outdoor activity. I was looking at this time as a transition to move the children into our math focus or math workshop event with some music to get them together in a whole group, then move towards the math lesson. We usually do a song, so they are used to that by this point in the year.

Although it is important to provide consistency in routine, it is also necessary to integrate a variety of activities in order to maintain the attention of the children.

David uses music to gather the children in a whole group in order to begin a new activity. David cues the students by asking them to join him in the group and help him sing the song. Notice how all the children actively participate in singing. They are obviously motivated by the singing. Active participation in the song signals the expectation for participation in the lesson.

Event 2

Introduction – Whole-group discussion to set up the activity for the lesson

Assessment

David Burchfield

At this point, I'm assessing what they're brainstorming. I'm listening to their choices, and I'm trying to negotiate or react to those choices if I hear something. I don't see assessment as just something that's a formal thing. It's ongoing and interactive. You listen and try to make sense of what they're saying. I would be listening for their choices and negotiating with them. If they said, "Oh let's measure the entire classroom," I would say, "That might be an activity we could do in the morning free-choice time as a small group rather than one group using up the whole hundreds of unifix cubes."

Classroom Management

David Burchfield

I had a few kids who'd just come in from the outside and were still hyper. What I try to do rather than focusing on the negative and saying, "Hey, sit up," is to look at children who are paying attention. I praise them and usually that pulls some others into line in terms of their behavior and their listening. I also tried to pause and use silence a couple of times to gather their attention and to really focus on what it was we were going to do.

Diana Lambdin

I wondered when I saw the children sitting there whether they were going to be able to attend to the lesson at hand. They were all looking around the room kind of half listening to what he was saying. He's obviously an experienced teacher. He noticed the inattention, and he has key words that the children are familiar with. He used those key words and positive reinforcement by pointing out one of the students who was doing what he wanted done and then pointed out how all the rest of them straightened up. There's a management technique that's very useful. After having done that, he paused and waited for the class to get quiet. That wait time I think is important. He didn't just rush right on now that he had their attention. He waited.

NCREL/IU

Students this age need to know the expected behavior because the routines and behaviors established at this level are the foundation for the way students will behave and learn in following years.

Notice how David praises one of the children for sitting up and listening. Children this age are eager to please their teacher. David uses the behavior of this one child to set an example for others to follow. By focusing on the positive behavior, children will naturally copy that behavior so they, too, can be praised and be noticed by the teacher.

Event 2 cont.	Introduction – Whole-group discussion to set up the activity for the lesson
Teaching Strategies	
David Burchfield	The lesson is introduced during our math focus in the morning. We are doing a mini-unit on measurement. The unit lasts about two weeks, during which time the objectives move from nonstandard to standard types of measurement. I cycle in and out of different themes to reach the objectives; in this case we're doing measurement. The strategy here is to have the children make a transition from the day before, recalling that we measured ourselves with unifix cubes and grouped the unifix cubes by tens and added the extras on top. They knew explicitly we were studying measurement. I try every day to go back and say, "Yesterday we did this; today we're going to do this." I 'm trying to tie things together for them. Also, what I usually do at the beginning of any activity is try to activate the knowledge the children have about things. In this case, I just try to get out a whole list of possibilities in the classroom that children could measure. That way, I just don't say, "Here, go do it."
Diana Lambdin	In giving the directions, he started by reviewing what they had done yesterday. I thought it was kind of a brief review. He might have done a bit more with that. Maybe it's more important for those of us who didn't see yesterday's lesson than for the children themselves. We can tell from his brief review that they measured themselves yesterday with the unifix cubes. When John had trouble thinking of something to measure, David demonstrated his wait time by waiting and waiting, almost until we were uncomfortable, to see whether John could come up with something. And he did! John came up with the Legos™. He got an answer from John and moved on. I haven't seen the lesson plans and I don't know exactly what was done yesterday, but he could have discussed not only what might be measured but what dimension of that object might be measured. When the first child says that they could measure a book, David agrees. Well, what could they measure about the book? There are at least three dimensions and possibly more. They could measure the diagonal as well as the length, width, and depth of the book. You'll see later in the lesson when we're looking at the answers that which dimensions the children measured does become important. Perhaps that could have been briefly discussed here at the outset.

Introduction – Whole-group discussion to set up the activity for the lesson

Teaching Strategies, cont.

NCREL/IU

When introducing a lesson, it is always a good idea to begin by relating prior knowledge or prior experiences to the lesson. Children learn naturally when they are able to relate new ideas and concepts to their experiences. By teaching concepts in isolation, children are forced to remember too many unrelated ideas, which does not allow them to understand the wholeness of their world. Notice that David begins the lesson by recalling the activities from the previous day such as students measuring themselves with the unifix cubes. He uses this prior experience to introduce the lesson for the day, which is to measure objects in the room, again using the unifix cubes. Since the children are already familiar with the concept of measurement from the day before, you can expect that they will be able to move naturally into the new activity for the day.

Students need to take charge and make decisions so they can feel ownership of their learning. Although David is specific with regard to the expected behavior for the math activity, he does not assign specific objects for the children to measure. They are free to take the direction they want so the learning becomes meaningful to them.

Brainstorming is especially important because it provides the teacher with immediate feedback to quickly assess the child's understanding. Children this age generally have a short attention span; therefore, brainstorming is an excellent way to involve all the students and maintain their attention.

Children develop mathematically at different rates, and it is crucial that teachers address this fact when planning their lessons. A child's experience should be enjoyable and within the appropriate level of difficulty with regard to mathematical development. Take a close look at how David responds to John when David asks him to identify an object to measure. He recognizes that John needs a considerable amount of time to construct his understanding of the problem. So David gives him time to think. It is interesting to note how the rest of the class refrain from calling out or whispering an answer to the child. This shows that not only does the teacher have respect for each child's rate of development, but the class as a whole respects each person's right to answer at his or her own pace.

Problem Solving

Diana Lambdin

Unifix cubes are easy for children to handle, but you can use anything at all. You could use popsicle sticks (How many popsicle sticks long would the things be?) if you are looking for a cheap alternative. It's nice that unifix cubes snap together to make a long train for measuring. We'll see that they are large enough that children will find that some objects fall somewhere in between, and David can get some good idea about the children's notions of fractions when they measure and find that it doesn't come out to an even number. If they had used something a lot tinier, measuring would have been more difficult. You could use Cuisenaire Rods. However, they're even more expensive than unifix cubes. The nice thing about them, however, is they come in different lengths, so you could measure one day with the orange rod and another day with the brown rod and you'd get different measurements because you're using different units.

He could have put more constraints on the assignment and said "I would like you to measure some things that are small and some things that are large" to force the children to take a variety of measurements. If they measured things that are fewer than 10 and others that are more than 50, that would have constrained the activity and forced them to be a bit more creative and to think, to worry about What could we estimate that might be more than 50? But the approach that he's taking here is actually what he said it is: brainstorming. He asked them to brainstorm what they might measure and he reacted nonjudgmentally to what they came up with. He didn't judge the answers at all. He just took them and that's what brainstorming is.

Event 3

Whole-Class Discussion – Solving the problem of how to measure objects using unifix cubes

Assessment

David Burchfield

The idea of having a recording sheet, rather than just going around the room and doing it, gave kids a focus of writing something down, which of course is literacy. I try to make a connection between math and communicating and literacy. It gives me an assessment, a written record of what it was that they did.

Diana Lambdin

He knows that Lauren understood about same and different measurements from a previous lesson. That doesn't, however, contribute a lot to his knowing whether the children understand the point he is trying to make because her answer was off target. He knows that one of the children has a good sense of estimating because the child was able to say that he thought the table was two cubes thick. In fact, David involved the rest of the children in participating in that guess and seeing whether it was close or not. So he was assessing their general number sense, their measurement sense.

NCREL/IU

Much of children's success in their future studies of mathematics is directly related to the quality of instruction they receive in the primary level. When David questions the students about the proper procedure for measuring the edge of the table with the unifix cubes, he is determining how well they understand the mathematical idea of measurement. It is important to establish a firm foundation of the skills and concepts of measurement if the students are to have a successful measuring experience. This foundation will enable students to apply, re-create, and invent measurement systems.

Classroom Management

David Burchfield

In terms of management I was trying to get as much information as I could across in a short period of time. I don't want this to go on too long because with young children, if you talk at them for 15 or 20 minutes about something they're supposed to be doing, you lose it, they lose it, and you end up having more management problems.

Whole-Class Discussion – Solving the problem of how to measure objects using unifix cubes

Classroom Management, cont.

David Burchfield, cont.

I was trying to model using the unifix cubes and aligning them with the table. I think there is always a tension in teaching between telling kids things that you want from them and trying to get some information out of them. Just like before, I could have said, "Well, you're going to measure this, this, this, and this," or "Do it this way." But I think children have more ownership; they have more mental energy. Another idea related to management that I firmly believe in is giving kids choices within a framework or structure where they develop more ownership, more meaning. I find fewer behavior problems when kids have some choice in their environment. If they have some ownership and choice in the structure, they strive and believe they have some say in what's going on. In fact, what happens to me is that there are fewer management problems in the lesson itself, because during the early part of the lesson, I try to get ownership on the part of the kids. I try to involve them in what can be measured, involve them in trying to look at that problem, even though I'm modeling it. I'm trying to do it in an interactive way to get them to think about something, even though I know the point I want to get across.

Diana Lambdin

David says several times, "Look, look, look" when he wants to get everybody's attention to look at what he's doing with the cubes at the edge of the table. I think that's important. Any child who's merely listening and not looking at what he's doing is certainly not going to understand the idea of lining up the cubes, and so that was the good management technique.

He praised Lauren's answer by saying, "That's right, then we'd be able to know if they're the same or different." It wasn't worth it at this point to digress and move the whole class's attention to some other topic. He wanted to focus in on what he was really doing here.

NCREL/IU

Notice that David's management does not disturb the flow of the class. If a child is not paying attention, he simply says his or her name and that is all that needs to be said to refocus that child's attention.

Teaching Strategies

David Burchfield

Lauren, the child who was talking, didn't understand my question. She made an interesting point, and I tried to give her some feedback. It was a nice little point that you could take something else that you measured that was about the same length, and you can compare them. Well that's good, but she was trying to say How long is it and what else could you compare it to? She had taken a different point out of it. And so I needed to redirect it or I needed to rethink with her and make sure that she understood what it was so I got some other kids involved.

Looking back on it, I might have thought a little bit longer with her to get her back onto what it was that I was trying to think about. I think she ended up getting it, and it ended up being a successful time for her. But I think I might have probed a little more with her to get her into exactly what it was I was thinking about in terms of establishing that baseline.

Diana Lambdin

In the previous segment, David had anticipated questions that the children might ask about what they could measure; and here he's dealing with how they're going to do the measurement. He wants to be certain that he reviews an important component of skill in measuring, which is the notion of lining up the unifix cubes with the edge of whatever you are measuring. I think he chooses a poor example. The thickness of the table is not an example that's easy to see. He would have been better to choose something else and maybe to give two or three quick examples. At first, when he asks the questions, the children are not sure what he's asking. Once he gets going they seem to have a clear idea. He refers to what they did yesterday with lining up their feet and the cubes at the wall, but when he was just getting into it, they didn't know that's what he was talking about. I think the problem may be that the sides of the table are not flat, and he is not able to actually, physically line it up evenly.

Then, he explains the assignment and, in fact, goes over exactly what's on the sheet, exactly what they're supposed to fill in and allows time for questions. That's well done. I think that there shouldn't be too much confusion at this point once he let's them go. They should know what the task is, what they're supposed to turn in, and what the important feature of what the measurement is.

Teaching Strategies, cont.

NCREL/IU

Mathematics involves more than being able to solve a problem. It involves children's attitude about mathematics and how they view themselves as mathematics learners. Notice how David responds to Lauren when she is asked about the procedure for measuring one object, and she provides a solution that could be used when measuring and comparing two objects. Although her response did not address David's question, he never tells Lauren that she is wrong, but rather acknowledges her solution then redirects Lauren's thinking by asking the rest of the class to help provide solutions to his question. Acknowledging efforts, even those that are incorrect, is so important when developing children's trust and confidence in themselves as mathematical thinkers.

Although David is focusing on the measurement process, one child is so excited that he responds by providing an estimation of how many unifix cubes the height of the table edge would be. David acknowledges the estimation by saying, "That's interesting" and he continues on with the measurement process. That quick, little response signals to the child that "This is interesting, I value your estimation, but we will check that estimation later on when we get to that part of the measurement process." David maintains the interest and motivation of the child, as well as the class, by returning to the estimation and checking by involving the whole class in the estimation process.

Problem Solving

David Burchfield

At this point in time, I was trying to give some guidelines and a framework for the activity that was going to be taking place. I've learned that you need to look ahead in the lesson and think about possible problems or possible issues you might encounter. Think ahead, if you will; so what I was trying to do was establish a baseline for the measurement with the unifix cubes there on that table. It came to me that a lot of kids wouldn't have transferred the knowledge from the day before.

Problem Solving, cont.

NCREL/IU

Children need to experience genuine problems on a regular basis, but they will often need support in thinking about the problem. It is important that the support is for the children's own thinking rather than the teacher telling them how. David provides support by posing a problem that might occur in measuring. Rather than telling them what to do, he involves the entire class, working cooperatively in order to solve the measurement problem. During this activity, students have the opportunity to communicate mathematically as they discuss and relate solutions based on their prior knowledge from the previous lesson.

Event 4

Transition – Following the procedure for setting up the math activity with partners

Classroom Management

David Burchfield

The students clearly needed guidance as they attempted to self-select into pairs or buddies. There was one particular little boy, Jason, who stayed seated, who needed assistance. He particularly loves Brandon and Brandon was looking for a buddy. I matched them up, and it ended up that we actually had a threesome, because one extra children needed to work with someone.

Looking back, in terms of preparation, I might have had some sets of unifix cubes out a little more readily. I had the buckets out on the tables, but some kids needed to come up to me and get some more unifix cubes because the other kids had already taken the buckets.

Diana Lambdin

Working in the pairs was an important way to organize this particular activity. It's a good opportunity for David to assess what they know in a lot of different areas including reading and writing, and he does that to full advantage.

He let them choose their own partners, and this may be the common practice in this classroom, although some teachers would prefer to either have set partners or to make the assignment themselves as to who would work with whom. You can't expect the children will be able to work collaboratively immediately without any training—that's the first thing. It looks so simple here on the tape to put the children in pairs and send them off to measure things.

Something that would be easy to overlook would be the fact that he sits there and hands out the papers rather than, for example, putting the papers on a stack on a table and saying "Now, help yourself to cubes and to a recording paper." I think it's a brilliant technique. He hands out the papers, and in doing so he's able to notice who's working with whom, make any last minute corrections that need to be made, and be sure that everybody does get paired up. When it comes down to the end and we have six or so children milling around who aren't paired up, he knows that. He's able to help them to find partners and to put some of them in a triple when need be. That simple technique of sitting there and seeing who's working with whom and making sure they all get started was very effective.

Transition – Following the procedure for setting up the math activity with partners

Classroom Management, cont.

Diana Lambdin, cont.

He's given them total autonomy as to what they measured. It may not be a project-based or problem-solving lesson in my view but it's certainly a lesson where the children have a lot of control over what it is that they're going to do. They're choosing everything that they're going to measure. They may choose to measure things that are very large because they're capable of doing that. I imagine that a lot of others keep the problem very controlled. They work with numbers that they're comfortable with. Certainly when we talk about a problem-solving-oriented curriculum, we're talking in large part about this notion of control. When children are confronted with something that they need to do, they have to be the ones to come up with how they're going to do it rather than a teacher just telling them, "I want you to do x, y, and z and here's what you do." I see this lesson having the features of letting the children be the decision makers.

NCREL/IU

Effective and efficient classroom management procedures ensure the success of this activity. David very clearly explains the procedures of the math activity. He allows the children considerable freedom to form their own groups. This gives the children ownership in the process and motivates them to be active participants. Observe how David attends to the children who have not yet found themselves a partner. He plays the role of manager and helps the students select a partner. He even offers to be someone's partner, which says to the children, " I am involved with your education and I care." Problems can result from allowing children to select their own partners; for example, if children who can't work together decide to form a pair. At this point the teacher must intervene and reform the groups.

As the groups form, David has the children come to him to pick up their recording sheets. Handing the recording sheets out to the children rather than letting them pick up the sheets from a pile helps David monitor the group formation process. David's method of allowing the groups to form results in a seemingly effortless transition from the whole group to partner activity. No one is left to wander aimlessly or to wait for long periods of time while materials are handed out. This allows students to get on task as soon as they are ready while both their memory of the instructions and their motivation is high. The transition did not just happen. David is constantly managing the process, moving the children along so that they can proceed with the task. Once again, as with Event 2, children this age need guidance in their early years of school so that the foundation can be set for future learning.

Transition – Following the procedure for setting up the math activity with partners

Teaching Strategies

David Burchfield

In cooperative learning, I try to get pairs working together a lot because I find that groups of three and four with 5-, 6- and early 7-year-olds don't work real well. Especially when you get around four; it's a big group and children are still somewhat egocentric and communicating with one other person is really effective. A lot of my thinking about children—communicating and talking out and negotiating, working with more capable and less capable children—is related to the work of Vygotsky's zone of proximal development.

In this lesson, the sense of cooperation or cooperative learning is not a formalized process; it's not where everybody has a role. Cooperation means pairing the kids up so that they can negotiate, communicate, plan, think together; just two children deciding together what it is they're going to measure, how they're going to measure it, how they're going to write it down, and agreeing on the number that they have chosen to write down. There's a lot of negotiation that has to go on.

One of the things I would be on the lookout for would be more dominant children who wouldn't let the other child talk very much or negotiate or participate. That's one thing I would be a bit concerned about in a self-selected cooperative kind of venture like this.

Diana Lambdin

The first thing that we might ask ourselves here is why did he choose to have the kid's work in pairs. I think that is a good technique. There are a number of reasons that working in pairs might be good:

1. They can help each other with all the things that are going on here: deciding what it is to be measured, checking each other's measurements for accuracy, watching out for silly errors, or not lining the cubes up at the end of the object, or so on.

2. The children will have more fun if they work with one another rather than if they work on their own.

3. There won't be as much confusion in the classroom when they're working in pairs. If they worked in groups of three, it would be less likely that each child would be really involved in the activity. There really isn't enough going on in this activity to have three children managing the cubes and doing the measurements.

Teaching Strategies, cont.

Diana Lambdin, cont.

I noticed that the cubes appeared to be organized in sticks of ten with rubber bands around them and that the children were just taking a lot of sticks to run off and measure with. Later in the lesson I don't notice them making any use of the fact that the cubes were distributed in sticks. It may be that they have never used them that way.

The same assignment can be beneficial to lots of different children at lots of different levels. So the ones that can't work with the really big numbers probably won't choose to measure things that are really big. The children who need that extra challenge get really excited about measuring something that's really big and about recording it even down to the nearest half cube. The same assignment spans a broad range.

Problem Solving

Diana Lambdin

I generally think of a project-based lesson as being a bit larger than this. A project would be a bit bigger in scope. It would have a goal, and the children would have to make a decision about how to reach that goal. But, of course, this is a first-grade class, so the project needn't be very large.

Event 5

Group 1 – Checking understanding of group that measures a book

Assessment

David Burchfield

I think of assessment as getting to know children in useful and informative ways all of the time, not just in a summative way. I was observing to see who had chosen whom, how they were getting to work.

I think what's important here is that no matter what time of day it is—whether it's the math workshop, the readers and writers workshop, or the morning work time—I use a three-step model of teaching, of interacting with kids. In the first step, I try to do my research and listen and observe and get into what they're doing. Occasionally I jump in and I say, "You need to do this." I try my best first to listen. That's my goal when I come up to kids and say, "How's it going?" I ask an open-ended question to get into their brains and say, What's up, how's it going?" rather than ask, "What's the first thing you need to do here?" because I saw that their names weren't on their paper. I saw they were measuring a book, and I asked them to think about whether they wanted to write the title or just write *book*.

Now, the second step of that model, after you've done your listening and your research, is to respond to them in some way and say, "Hey, sounds great." You can do some teaching; you can question; you can do all kinds of things. In that case I offered them an option of things they could think about. Then I decided to let them make a decision about it. I didn't make the decision, I tried to give them some options.

The third step is to evaluate or review what I had done. I try to revisit my students at the end of the time to see if what I said or did or thought with those kids made a difference. Did the focus of my teaching help, hurt, and so forth?

Assessment, cont.

Diana Lambdin

There are several ways a teacher could keep track of the children's performance in this sort of open situation. The teacher could have a bunch of sticky labels that can be peeled off. As he notices a particular child or a pair of children doing something that he wants to remember for later, he simply writes their name or their initials on the label and a quick note. At the end of the lesson he may have 15 or 20 of these little notes. Later when he does have time, he could move these labels and stick them in a notebook that's organized page by page by child and therefore construct a running commentary on the children. That's much more effective than trying to have a notebook with a page for each child that you have to flip through while you are walking around the room, and you have to find "David's" page before can write a note about David. It's much less obtrusive to be writing on little labels than to be paging through a big, fat notebook and the children are wondering, What's he writing down about me now?

Another way that you can do ongoing assessment is to have a five-by-eight card for each child. These five-by-eight cards are arranged on a clipboard, one on top of the other like in a photo album where the different pages flip up. All you can see is the bottom quarter-inch of these cards with the child's name on it. When you want to make a note, you can flip up the rest of the cards to reveal the one for that particular child and make a note. That way you have only one sheet that's in front of you. That's a method I use to observe student teachers, and it works very well.

NCREL/IU

When working with groups, it is always a good practice to initially visit and question each group to determine if they are on task. David helps this group get started by reviewing with them how to use the recording sheet and by questioning them about what they plan to measure. This questioning technique helps the children focus on their task. Notice that David does not tell the children how or what to measure; rather, he checks with them to be sure that they have some sort of plan for solving the problem. As seen in Event 4, David allows the children to make decisions, thereby reinforcing the notion that this is **their** classroom, a place to explore, create, and grow. By giving them this freedom, the teacher can monitor their understanding through observation of the group interaction.

Classroom Management

Diana Lambdin

Notice that even though David gave very explicit directions and went over the worksheet, explaining exactly what was going to be written on it, these boys still needed some help getting started. David is there to give them that help. He gives them the option, "So what would you like to write here, if that's what you're measuring? Would you like to write 'book' or would you like to write the title of the book?" Here he had to reiterate what the directions were for the task, but he didn't constrain them too much. He allowed them to decide for themselves what they were going to do.

You have to decide what it is that you want to accomplish and see how close they're getting to it. If most of the class has nothing written on their sheets yet, then little progress is being made. They must be doing something other than what they're supposed to be doing. It might be that they're not capable of doing what you've asked them to do. As you look around, see whether they're having great difficulty either with writing down what it is that they're measuring or with doing the measurements. Sometimes you have to stop in the middle. Give more directions. Give an example. Demonstrate for the class. Sometimes you have to call the whole thing off and say, "I'd like us to come over here and do some of these together." That's that feeling of being out of control because you're never sure whether the lesson is going to go as you expected or not. You need to know your expectations, and that's how you judge whether to let it proceed or not.

Teaching Strategies

Diana Lambdin

There are several skills involved with this activity. The first is the chance to be creative. The children are able to choose what it is that they're going to measure and are able to brainstorm. They'll probably choose things that interest them and are within their capability of measuring. Another skill that's involved is the ability to measure; in other words, knowing where to place the cube and counting them. Counting is a big part of this activity: being able to count the cubes by groups of tens and adding on ones or by just counting from ones all the way to however many.

Teaching Strategies, cont.

Diana Lambdin, cont.

Writing both words and numbers is another big part of this activity. Some of the children will be able to write independently and others will need to be helped. These boys may choose to write "book" rather than the title of the book simply because it's easier. It's something that they may be able to spell rather than the title. I noticed later that a lot of the objects in the room are labeled with their names and so the children can copy directly. Then, how they're going to record what they're measuring is no longer a stumbling block.

Assessment

David Burchfield

I usually carry a clipboard around with me to write down some notes, and I have a little recording form for anecdotal records. I don't write down everything; that would be exhausting. But I didn't have it with me, and that's interesting because usually during math and readers/ writers workshop I have that with me. I might have noted, looking back on it, that Lauren had shown a little bit more confusion about some things. I often will regroup some kids whom I notice are having some difficulty in the morning work time to kind of follow up. I didn't do that with her, and I might have.

Once again, I see that he's allowing the children to do it on their own, and he's standing back assessing how they're able to perform. Where he's going to need to go next with his lessons on measurement can only be figured out by watching how these kids actually do measure the cage or the bunny or other things. We can't see that overtly going on, but I'm sure that that's part of what's happening; and he's making judgments, I'm sure, about what else they need to learn.

NCREL/IU

A teacher's role in group activities should be that of a coach who is available when students have questions. Sometimes teachers can anticipate when a group needs help by simply stepping back and taking a moment to observe and listen to the interaction. Notice how David stands back to observe the group interacting. By listening and observing, David is able to assess the students' knowledge and understanding of measurement. When David observes that this group is having problems, he steps in to facilitate the process by questioning the group about how they will measure the bunny (by how tall, how long). This questioning invites the children to think about the attributes an object has and the options they have for measuring that object.

Classroom Management

David Burchfield

I was standing with my back against the wall, looking and observing elsewhere in the classroom, so I was getting a feel for what else was going on, even though I was trying to interact with kids.

Classroom Management, cont.

David Burchfield, cont.

There were about two or three pairs gathered around the bunny, and I was concerned about the safety of the animal. There was high interest in the bunny because it was new to the room; it's a live animal, etc. When we bring animals into the classroom, I really place a high value on safety and caring for them. I went over to monitor that and interact with them and make sure that what they were doing was safe.

Diana Lambdin

There's a lot going on here. This teacher is managing to do about 10 things at once. At the same time that he's dealing with the safety of the bunny and the measurement of the bunny, he's helping someone else to spell the word "cage." David's also unbundling cubes so the children will have more to work with. He also helps Jason to get on with the job of measuring the blocks by saying, "Put your other things down so that you'll have some hands free to do this." I see a lot of management going on. There's a real feeling, for the teacher who has never done this kind of teaching before, of being out of control when all of the children are scattered around the room doing things, and you're not sure exactly what's happening in every corner of the room. You can't keep your eye on all of them at once, and too many are asking you questions at the same time. Teachers shouldn't feel bad if they can't launch right into this kind of teaching, but they should know that it's very exciting and rewarding. They can work as well as David does in this tape, but they need to work up to it.

When the students ask David, "Can we measure the bunny?" he leaves it totally up to them. He lets them be independent: "It's your bunny. You can make that choice." He keeps his hands off. He doesn't go over and hold the bunny so that they can measure it or stretch its legs out or whatever needs to be done to take the measurement. However, he hasn't walked away either and left the bunny to the devices of these children. He prompts for suggestions with the bunny ("Which measurement do you want to make? Do you want to measure how long it is or how tall it is?") so that they could get on with getting it measured and getting it back in the cage.

Classroom Management, cont.

NCREL/IU

It is important to position yourself in the room so you are able to maintain eye contact with all the groups in the room. Notice how David positions his back against the wall as he moves from group to group. David designed the lesson so the children can be actively engaged in the learning. This active involvement allows the students to assume ownership of the activity. When you provide students with activities where they assume ownership, you increase their level of interest, which then results in greater time on task.

Problem Solving

David Burchfield

I had observed a crowd around the bunny. I was over there trying to make sure that what was going on was thoughtful, safe, and interesting. I was trying to get them to look at different ways they could measure the bunny. Rather than just thinking about length, they could have done height. I wanted to give them that choice, to help them explore possibilities.

The lesson itself is not about volume or measurement of weight. It's about measurement of length and width: those types of things that can be measured in a linear manner. I was attempting to focus on that content.

Diana Lambdin

Realistically we may want to measure the bunny. We might be doing a science experiment at some other time where we want to know how much the bunny grew in the last week or month. A bunny is a more difficult object to measure than a block. We're likely to not get as accurate a measurement because the bunny may be squirming, and it may not be easy to tell where his nose and his tail begin and end. But I think it's a realistic problem. The children were interested in measuring the bunny.

Teaching Strategies

David Burchfield

This scene is not just about numbers; it's about safety and other issues that go with it, including literacy. I was doing some inventive spelling and trying to help the children record what it was that they wanted to write down. This is engaging them in literacy in terms of recording the objects. Some of them are first-/second-grade level words, but some of them are much more difficult, so they're having to use their transitional, developmental, inventive spellings.

Teaching Strategies, cont.

David Burchfield, cont.

When I'm doing an interactive lesson like this I have in my head a range of teaching strategies that I can pull out. I do it in an interactive way. I do it in a responsive way. I don't say to myself, Oh, I'm going to go up and I'm going to do this to the child. What I'm saying is that I try to listen, I try to observe, I try to interact.

It's a fast pace. One of the things that strikes me about this scene is that it was a very exciting time; the children had a lot of energy and they were very excited. I'm also at a fast pace in it. There's a tension between the fast pace and slowing down enough to really interact meaningfully and respond well.

At the end of the scene I heard Lauren, the child who had a little confusion earlier with the idea of comparing the numbers. She was talking about inches. I wanted to make sure I questioned her about what standard she was using. Is it inches? And make her think, wait, this isn't inches, it's unifix cubes.

Diana Lambdin

At the very beginning of this segment David asks Jason, "What is it that you're going to measure?" and Jason says he's going to measure the blocks. Notice that that's exactly what Jason said early on in the sharing circle when he was asked what they might measure. Jason is able to carry out what he wanted to do. He wanted to see how big those blocks were and that's what he's going to do.

David may be more formal than a female first-grade teacher, but I noticed him singing along in the beginning. The children were all involved in this song and he's in there with them. I thought that it was a closeness different from being touchy and huggy. I noticed that at the end of the sharing, when he gave directions, he used a funny little accent or something to say "Do you understand what I've said?" and "Are you ready to go?" and the children laughed and gave him the signal, "Yeah, we're ready to get started on this activity." That kind of joking around and camaraderie may be his way of being close with the children. I don't fault him for appearing more formal than some first-grade teachers.

Teaching Strategies, cont.

NCREL/IU

Children need to be involved in activities that promote interaction, discussion, and decision making. You can tell that the children are actively involved in this math activity. Here they ask David if it is okay for them to measure the rabbit. He asks, "Why are you asking me? It's your bunny rabbit." By responding in this manner, David is reminding the children that this is their classroom; they are the decision makers; and they are free, within reasonable constraints, to be creative with what they measure.

This measurement activity is an excellent way to provide the children with opportunities to interact and communicate mathematically. David helps the children build their math vocabulary by using words such as *tall, long, even.*

At one point during this event Lauren refers to the unit of measurement as inches when, in fact, the unit of measurement is a unifix cube. David uses short, targeted questions to help Lauren clarify the unit of measurement as unifix cubes. However, he then says to Lauren, "Then we can say 10 unifix cubes." One might consider continuing the questioning so that Lauren generates the appropriate response and completes the thought process rather than having David provide the response for her. In Event 15 we see how Lauren self-corrects her terminology and demonstrates her understanding of measurement. In this case, David's intervention works; however, it is usually more effective to keep the learning student centered and allow the child to complete the thought process. It is important for children to understand that measuring requires using a predetermined unit to assess some element of size—the unit can be anything.

Learning should not be taught in segregated parts. It should be whole, integrated, and natural. Having the students record their answers is an excellent way to encourage communication while incorporating multiple content domains. Not only are these students practicing number writing, but they also are integrating language arts by sounding out and writing words. Notice how David facilitates the child when trying to spell the word *cage*. Here it is the approximation of the word not the exact spelling that is important. David does not spell the word for the child, but rather encourages the child by repeating sounds so the child can identify those letters to the best of her ability. During the share circle she will need to be able to read what she wrote so it's important that what she writes makes sense to her. Communication is an integral part of mathematics.

Event 7

Group 1 Revisited – Using questioning strategies to guide the group

Assessment

David Burchfield

I was trying to get him back into the activity. I wanted to redirect him back, "Yeah, okay fine, now what have you measured?" He told me they measured a book and it was 33 unifix cubes. It wasn't 33, it was 13. I didn't say no; I tried to get him to look at the number and make sense of the number. Of course, first grade or around the age of six is a time where kids are beginning to make sense of that concept.

Diana Lambdin

He is double checking whether what's getting recorded on the sheets is accurate and is actually what they measured. Also he is checking that they actually understand what they've recorded. It appears that we have a child who recorded something on his sheet and can't read it back to David. It may be that the partner helped with recording the number, and David is trying to get a sense of what this child really understands about what's on the sheet and what he can do to help him in terms of reading it back. The problem number was 13. You see 13 sounds like just a single word. It's a difficult concept for children. It's not like 23 where we can almost hear the two tens and the 3. When David says one ten and 3 more, the boy still doesn't get the point. The boy has to count from 10 all the way up and say, "Hmmm, 11, 12, 13. Oh you have 13." The notation for 13 doesn't evoke in his mind the idea of a ten and a 3 and that's what David can see by questioning him in that way.

He may not be the only child in the room who doesn't understand 13. They may need more activities with tens and ones and with representing numbers with a certain number of tens and a certain number of ones. They're not familiar enough with that concept, and that's what David is finding out.

The children were recording what they had measured, and one child recorded it as so many inches. David overheard and decided that it was worth interrupting to say, "Wait a minute. Was that inches? What is it that we're measuring in here?" When we teach measurement, we usually start with some kind of nonstandard units. We measure in hand widths or we measure in popsicle sticks, or we may measure with unifix cubes. It's interesting how children understand that this is measurement in the formal sense that we use in the everyday world. Inches are the measure that they're most familiar with and they tend to use the word *inches*. David caught this and pointed it out to the children.

Group 1 Revisited – Using questioning strategies to guide the group

Classroom Management

David Burchfield

The child I was interacting with typically will involve me in a conversation that is not about the task we're doing. He came up to me and wanted to talk about how he put his finger up to the rabbit's mouth, and the rabbit tried to bite it. It had nothing to do with the task. I was trying to get him back into thinking of what he was doing with his partner. I think if I had not challenged him to get back into it, he could have just wandered around with the sheet, and his partner would have done all the work. I observed, based on what he said, that he was telling me, "I'm not really doing this; I want to talk about the bunny biting my finger," which is really typical. I attempted to get him to do some thinking and to get back there with his partner.

If you're attempting to make the classroom a place where it's active and the children are social, then you've got to have a standard in terms of interrupting. I usually use a hand signal. I put my hand up because the person who is interrupting the conversation interrupts my thinking, interrupts the child with whom I'm speaking or who's speaking to me. We have three rules: be safe; be a thinker, which means also be a good choice maker; and be considerate. To me being considerate is listening because when you listen to someone you're being considerate. If I had let the other child just interrupt me and redirect my thinking, I wouldn't have been respectful or considerate or a good listener to the child I was talking with at the time.

Diana Lambdin

When several groups are clamoring for his attention, which group is going to get it? Tiffany and her group are calling from the other side of the room. He tells them, "Wait. I'll be there in a moment. Hold it." and finishes with the group that he's with. It's tough to do that as a teacher. You usually have more than one group calling for you. There's usually three or four other places to be, and it's tough to juggle it all.

Group 1 Revisited – Using questioning strategies to guide the group

Classroom Management, cont.

NCREL/IU

When working with groups, it can be challenging to manage all the needs of each group. You'll notice that while David is working with a child from Group 1, Tiffany calls to him for help. David responds firmly yet fairly by telling Tiffany not to interrupt him, but he will be over to her as soon as he is done with Group 1. Note that he respects the group he is talking to by not permitting interruptions. He models for the children awareness and mutual respect for individual and group needs. These basic principles of interaction are necessary for effective management. It is important to remember that if you make a promise to go check on another group, then follow through with that promise. Children do remember when a teacher makes a promise, so respond to that child at the first opportunity. This communicates to the child that his or her needs are valued, and he or she is as important as the others in the classroom.

Teaching Strategies

Diana Lambdin

Notice that some of them are not very skilled in recording their numbers but he does talk about tens and units. "How many tens did you have? How many units?" I'm not sure that if they've counted them by ones and they've counted, let's say 13, do they really have the sense that they have the ten and three ones? Therefore, the recording of the number may be problematic. However, if they put down a stick of ten and then had to put on three more ones, they might have a better sense that they had a ten and three ones. This may be a lesson that he's leading to. When I see the unifix cubes being distributed in groups of ten, then I anticipate that they might be used in groups of ten.

Notice that David actually gets down to the level of the children quite frequently. He squats down so that he can be at eye level to talk with them, and he listens carefully to this child. The child wanted to tell a little story about the bunny, which was unrelated to the measurement of the bunny. He patiently listened to the story but immediately redirected the child's attention to the activity at hand. "That's very nice. It is a nice bunny. Now what are you going to measure?" and the child had to get back on task.

Group 1 Revisited – Using questioning strategies to guide the group

Teaching Strategies, cont.

NCREL/IU

One of the children from Group 1 approaches David and talks to him about something that does not seem to be related to the task. Instead of telling the child that he is not focusing on the task, David acknowledges what the child has to say and then directs him back to the task by asking, "What are you going to measure?" This open-ended question refocuses the child by requiring him to respond with a decision about his plan of action. He isn't just following David's direction.

Take a look at how David and the child discuss the answer of "33." David assesses the child's understanding by asking questions that require him to define his answer. The child tells David the answer is "13" but he actually wrote "33." When David realizes that the child does not understand the number 13, he changes his strategy by posing specific questions relating to place value. David's questioning technique guides the child to clarify and refine his thinking about number representation and place value. This incident is an example of the way teachers can employ questioning to encourage discovery through reflective thought. Also notice that the child uses his fingers as manipulatives to figure out how many ones there are in 13. Using fingers to help count is fine because it helps define the abstract number symbol with a concrete representation of that number.

Questioning is an effective strategy to use to probe children's thought processes and guide their understanding. For example, David returns to the group that was measuring the rabbit cage when a child asks David about writing the number 21. Instead of David telling the child the answer, David poses short questions to stimulate the child's thinking. David's questioning encourages the child to think about the problem and recall the answer. Although it would have been quicker to tell the child the answer, it is better to take the extra time to allow the child to construct the answer. Learning becomes more meaningful and lifelong if the solution is generated from the child.

Event 8 — Visiting Groups – Brandon and Jason discuss their measurement results

Assessment

David Burchfield

Sometimes I get a little too serious about teaching and learning, and it's fun to lighten up and laugh with a child about the unifix cubes that had fallen down. Sometimes I think I tend to overkill on teaching. In terms of teaching strategies, there's a point where you check in with kids; they explain what they've done and basically say, "Everything's fine, we're doing a good job, we're recording what we're supposed to be doing." Really what you're honoring is their independence and their ability and saying, "Great, go for it," rather than feeling like you have to correct or teach. Teaching is one of the things we can do. Saying, "Hey, great job, go for it," is another thing.

Diana Lambdin

I'm interested in Brandon's comment that he measured the computer and it was 16 1/2 and David says, "I like the way you wrote 'and a half.' It was just a little bit more?" "Yeah, like half of a half." If I were the teacher I'd like to follow up more on that later, maybe by talking with this child or making a note that Brandon has the sense of finer divisions than simply a half. To many children, a half is something that's just in between. If it's anywhere between 16 and 17 then it would be 16 1/2 for many children. This child has a more precise notion that it was smaller than 16 1/2; it was like half of a half. That's well on the way to understanding what a quarter is.

Classroom Management

David Burchfield

I don't use extrinsic rewards. I use terms like "You're on fire for learning; gosh you're going for it, looks like it's going great!" At the end of every work time in my classroom, we have a time where we get together in a circle and share what they've done with others. There's a sense of coming together to brag about yourself. So it's not stickers or rewards, but "I feel good because I've learned and I worked hard and I'm going to tell you about it and I'm going to tell about the strategies I used."

Diana Lambdin

David's down on his haunches again—eye level with the children—to talk with them. At the same time that he's talking with the one child and also monitoring what's going on in other groups around the room, he thinks that Jason and Brandon need more attention. So he asks them, "What have you measured?" Jason responds, and David praises him, "Wow, did you measure the computer? That must have been something!"

Teaching Strategies

David Burchfield

I remembered Tiffany had asked for assistance or wanted to talk to me about something. I went over and asked what she needed and typically she wanted to demonstrate her learning. I think that the self-esteem was playing in there. With reinforcement, praise, and feedback there's a balance to be struck because constantly giving gushy feedback gets old. I try to give corrective feedback. The kids in a classroom know when they're doing a good job; they know when it's going well, and you don't always have to say, "Hey great job." I think kids understand that. Certain children, though, you have to respond to with feedback. Some children are always looking for praise. Some kids hardly ask for it. Some children need a lot of corrective feedback.

Diana Lambdin

Notice that David asks about measuring the computer, "tall or how long?" I would have dealt up front with what dimension you were going to measure on various things. They might not have had to record it on their sheet but when asked they would have been ready with an answer, "Oh, I measured how long it was," or "how wide, " or "how tall." Later in the lesson he mentions, "There are a lot of words here that we need to clarify: height and length and width."

NCREL/IU

In real-world situations, measurements without referents are essentially meaningless. For example, when measuring the perimeter of a room, the number six could refer to feet, yards, meters, or any other unit of measure. Therefore, the classroom needs to be a place where children can have adequate time to practice defining and clarifying mathematical terms on a consistent basis. The teacher can facilitate this practice by asking questions that require the child to think and respond to issues concerning referents. These skills then become second nature and children can apply them in a thoughtful manner without prompting from the teacher. In this event David notices Brandon walking by and asks him what he and Jason measured. When they respond, "the computer," David asks them to define how long or how tall it is. Notice that David asks this question quite often especially during the share circle in Event 15. The need to ask this question over and over indicates that the children do not yet have an awareness of identifying referents when measuring. While David periodically prompts the children to use referents, he does not require them to use them on a consistent basis. Because he spot checks at this time, there is confusion later on during the share circle in Event 15, because the children neglect to report what dimension they have measured.

Teaching Strategies, cont.

NCREL/IU, cont.

Cooperative heterogeneous groups provide the opportunity for children to interact and learn from each other. Not all children in a group develop at the same rate but each one benefits from the group experience. For example, you can observe that Brandon and Jason are at different levels of mathematical development. The partner who is more advanced can assist the other member by acting as a peer tutor. Such tutoring activities are valuable experiences for integrating and reinforcing what the student knows. In an open-ended group activity, each student is free to choose problems that challenge his or her abilities. The less-developed person advances by communicating, observing, and interacting with a classmate who can explain a problem in terms that are understandable to him or her.

Children need to know how they are progressing to maintain their motivation and interest. After Brandon and Jason share their experience with measuring the computer, David praises them and they go on their way to measure more objects.

Event 9 — Table Measuring Group – Incorporating writing with math

Assessment

Diana Lambdin

There isn't a lot of measurement going on in this particular segment. Most of this segment was concerned with the children trying to write the words *pencil* and *chair,* and so he's doing a lot of assessing here of their ability to spell and to write. He certainly has taught them some of this phonics and now he's able to see if they've got it or not without giving them a phonics test.

Classroom Management

Diana Lambdin

Notice that he seems to give his undivided attention to this pair, and yet the rest of the class seems to be functioning just fine. Many teachers would envy him in this class. How is it that the rest of the class is able to function on their own? The groups work because he's made clear what the expectations are. They're all actively involved. They have been paired up in ways that they can be successful. He made some adjustments with how they could be paired. The task is well within their reach and they've obviously done lots of investigations on their own before. This wouldn't work this way with a class that had never worked in pairs, that had never been independent, never done this type of work before. This has to be built up. We'll see later that he has other routines in the classroom that the children are familiar with. I'm sure that this type of an investigation lesson is familiar to these children. They're used to going off independently and figuring something out and making records of it. Therefore, they can function independently while he works with some of them.

Problem Solving

David Burchfield

The teaching strategy I was trying to use in this lesson was everybody using the same standard—unifix cubes. If I had stretched it to where some kids were using paper clips and others were using unifix cubes and others were using inches, it would have been a big expansion of the whole lesson. It's like letting out the string more. So I wasn't overly concerned when they said the number if they didn't say the word *cube* , too. We've been working with unifix cubes all week, so I probably wasn't too concerned about that.

Problem Solving, cont.

Diana Lambdin

I realize that unifix cubes are especially useful because they stick together and can be used to measure vertical as well as horizontal surfaces. Popsicle sticks or even paper clips work fine for measuring the length or the width of the table, but aren't good for measuring height. Notice that David is not having them use even the simplest of rulers to begin with because they would have to be able to read the markings on the ruler even if they were only to the nearest inch. The major point about the unifix cubes is that the measurement is preserved as soon as the length of cubes is assembled and any excess cubes are broken off. We have this length of cubes that can be counted and recounted if necessary to see what the measurement is. With anything else that doesn't stick together, we can't have a permanent record. Once we take it down from measuring the height, we can't see what it was again. The boys had this long thing for measuring the height of the table, and they were able to look at it again.

Teaching Strategies

David Burchfield

I usually ask open-ended questions when I come up to kids. When I asked, "How's it going?" they said that it was okay, and they were involved in what they were doing. Both of these children are very strong in their math skills. What I noticed when I was sitting there was that their measurement was reasonable, but the same children who have greater ability in math have less ability in literacy spelling. So I responded to them by helping them.

Much of that scene was sounding out the words, and that's what they needed help with; it wasn't so much the math. And I don't know if I did overkill on it or not. The point was to get the word written so it could be read later. Trying to get the recording step down was what I was trying to focus them on.

Diana Lambdin

I have to wonder whether this really is the best time for teaching phonics, in the middle of this measurement lesson, and it may be, but I probably wouldn't have done it that way. I probably would have ensured that more things around the classroom were labeled so that more children could simply copy them or encouraged them to use inventive spellings and just write it as best they could and not worry about it now. "We can talk later about how to spell *chair*, put it down however you like." However, it could be very effective to deal with the situation of how to write the "ch" sound when it comes up in a real-world context and you really need to use it.

Teaching Strategies, cont.

Diana Lambdin, cont.

It may be that it's very compelling at that point rather than during a phonics lesson. If David encouraged invented spellings, the children wouldn't be able to read what they had written later on. They would not remember what this was supposed to represent. So maybe by encouraging more standard spellings he ensures that they are able to read it back. There are other ways that they could ensure that they could read it back. They could put a small picture next to the word if they weren't sure of the spelling and then they could say, "Well, it was supposed to be *chair*. I'm not sure if this is the way you spell it, but I made a little picture of a chair so I knew."

NCREL/IU

David approaches this group and asks the children an open-ended question, "How is it going?" He listens carefully to their responses. David can check for understanding by using their responses as an indicator of their progress. His questions require the children to step back and look at the process they are using to reach their goal.

Mathematics should not be seen as being taught with separate skills to learn. Young children do not learn in parts or separate skills but learn through the total experience. In Event 9, as with Event 6, we see David incorporating writing into his lesson on measurement. David accommodates multiple objectives by helping a child sound out the spelling of a word. He is careful to include both members of the group in the spelling action, which encourages active participation. He also acknowledges to the one who is recording, the efforts of the boy who is doing the actual measuring. Such recognition serves as a very strong motivator and models behavior that peers can copy.

Event 10 — David observes the group to assess their understanding

Assessment

David Burchfield

This scene with the two boys is really interesting because they are good buddies, usually self-select together, and are fairly productive. It's a good self-selection because one has more advanced skills and the other fewer. I knelt down and just listened there for a little bit. I didn't feel like I had to say something; I didn't jump right in. I came up, they knew I was there, and I was listening to them count. I didn't interrupt, which I have a tendency to do. When it was appropriate, once he finished counting, I attempted to get in there and think with him about the number he needed to write down, which was 61. For me, showing patience and waiting was good in that scene.

Diana Lambdin

This is an example of assessment. He watches them count. They are up to almost sixty, "59...60!" and then "61." David holds back, "Wait," to see if they know how they're going to transcribe this number. When they look to him for some reinforcement for what they're about to do, he provides it. "So what are you going to write?" "I'm going to put a 6 for 60." "Right! And then what?" "And then I'm going to put a one." David's not jumping right in to tell them or correct them. He's letting them deal with it. They don't seem to expect him either to be participating a lot or asking a lot of questions. They're comfortable with him coming and peering over their shoulders to just see what's going on. David's learned a lot about what this pair understands about transcribing the number 61.

NCREL/IU

As students become involved with their group activity, David acts as more of a mentor or coach. This allows him to assume a less active role so he may listen to and observe students interacting and using manipulatives. David observes a group for a moment or two before he makes any comment. This observation strategy is essential for assessment. Often children's actions and interactions tell us more than their responses to direct questions. When David does speak to the group, it is to check for understanding about the value of the number they wrote.

Problem Solving

David Burchfield

I think the child with greater ability was leading the way and not being limited. The level of what they were measuring, the choice and amount of unifix cubes, was not limiting the top child at all; in fact, it was probably the choice of the top child. It was the stretch that the other child needed to see. One was working at his level and the other was being pulled or led by the other. I don't see the heterogeneous grouping as a limiting factor at all; in fact, it benefited both children.

NCREL/IU

Classrooms that are well equipped with a variety of materials and supplies encourage children to explore. Each group that David visits is actively engaged in measuring many different objects in the classroom. The more variety within a classroom, the more options there are for children to create, investigate, test, and discover.

Teaching Strategies

David Burchfield

Rather than having him try to do invented spellings, there was a sign, a label nearby of the thing they were measuring. It worked well to say "Where could you find the name of what it is you just measured?" They could then just copy the name. For young children, constantly having to do invented spelling may be useful for constructing, but it gets old. So they found the words *art easel* and were able to just copy them, and that worked well.

The freedom in this exercise is important here. If I had set one objective for a heterogeneous group, it would probably be at a minimal level: an objective that is going to get as many children to the objective as possible. I'm going to set it somewhere around the low end of the norm probably. However, here the boys had the freedom to negotiate a variety of things that can meet both needs.

Diana Lambdin

Notice that he does have *art easel* , which is difficult to spell, labeled so that it will be easy to spell, and they can record it and read it back later. That facilitates the whole process.

Assessment

David Burchfield

Assessment is observing, listening—doing my research as a teacher to observe what's going on and then responding appropriately. I was trying to understand what they were measuring. I didn't understand exactly what they were doing, because I observed the unifix cubes were taller than both of the things they were measuring. I was confused as a teacher; I needed to get more information. I questioned them further, and it appeared they were right on with the measurement, but they needed help with recording.

They were not writing down what it was they had measured; the recording step was a problem, so most of the interaction at that point was noticing they had not recorded the trash can and trying to get them to write down their information. If they are going to report their information at the end—that's part of the design of the lesson—they need to be able to come to the group and at least be able to read or understand what it was they measured.

Assessment and instruction means listening, responding, observing, and questioning. It's an interaction; it's a conversation.

Diana Lambdin

David comes over, sees this pair, and notices that they're measuring the height of something. In order to assess how well they're doing, he needs to know what it is that they're measuring. The two of them probably know what they're measuring but David's not sure. In fact, he sees that they've written down on their paper that they're measuring the trash can but it appears that they're measuring the block case. It turns out that they'd omitted writing down how big the trash can was. David's assessing their ability to measure and pointing out to them a little omission in the paperwork. He deals again with the issue of how they're going to spell, what it is they're writing down, and sort of gives it half a mind as his eyes scan the rest of the class looking for where is he going to move next.

Classroom Management

Diana Lambdin

I noticed that he has to call out again to Tiffany and ask her to talk softly with her friends, and this is the second time he's had to refer to Tiffany to calm her down. I'm surprised that we haven't seen any interaction with Tiffany if she's a child who is demanding this kind of long-distance attention.

He keeps moving. He doesn't get stuck with any one pair. I anticipate that he'll make the rounds to most of the children before the activity is done.

Classroom Management, cont.

NCREL/IU

The children are never told what their roles are, but the roles evolve naturally from actually doing the measurement activity. It is obvious that this class is used to working cooperatively because David rarely has to remind the children that they need to act responsibly and respect each other. This respect develops over a period of time and needs consistent monitoring by the teacher.

At one point in this event David does use a quick, verbal cue to remind Tiffany that she needs to talk softly to her friends. That is all it takes for him to help Tiffany remember. Mutual respect among students and between students and the teacher is a key component to successful group experiences.

Problem Solving

David Burchfield

It was nice to see that Mike, who earlier had been coming over to me needing feedback on the bunny biting his finger, was really engaged in that scene, actively thinking. You could see in his face that he was really thinking about the activity and the number. It was also interesting that they had not rebuilt the unifix cubes. I didn't understand what it was they were measuring because they had a very long stretch of around 40 cubes. They had taken all 40 and put them up to the trash can and counted up to 26. Kind of like using a yardstick and only counting 20 of the 36 inches. They were very involved and they were very much on task.

Teaching Strategies

NCREL/IU

Children need to take responsibility for their thinking in order for learning to be meaningful. David questions the children to probe their thought processes and understanding of how to spell the word *block*. David rarely tells the children the letters. Instead he encourages them to carefully listen to the sounds of the letters as he says them.

It is clear that David has high expectations for the ability level of the children and knows that they are capable of meeting those expectations. By questioning the children through the problem-solving process, David is holding the individuals accountable for their own learning, because ultimately they must generate the answers.

Event 12

Estimation – Brandon estimates the length of the table to be 97 1/2

Assessment

Diana Lambdin

We do see that however bright Brandon may appear to be, he isn't using sophisticated strategies to count up the cubes. He almost got interrupted by the child who came to hand in his paper. If Brandon had been interrupted and lost his place, he would have had to start back at the beginning. He's using a primitive counting strategy. The teacher, therefore, can judge that Brandon can count rationally. He's able to do the one-to-one correspondence that's necessary to match every number with one object, but he could count in a more efficient way. David is able to observe their counting skills as they're doing this activity. Are they able to rote count? Are they able to use more sophisticated types of counting? Do they have trouble with the one-to-one notion; for example, counting the unifix cubes and missing one and reciting two numbers on one, so the counting doesn't accurately portray what's there? There's also this notion of measuring, of lining things up; this notion of accuracy in measurement and consistency.

Classroom Management

David Burchfield

Brandon called me over where he needed help with something. I think that's nice because he's a very capable child and yet he was able to say, "I need some help." That's a good reflection of the environment; that it's okay to say, "I need help." After asking for and getting more unifix cubes, he wanted to take over and stretch them out to the end of the table. But I interjected and noticed that Jason needed to participate more. Jason was able to put some unifix cubes out, and he did that well. He stuck them out towards the end of the table.

Diana Lambdin

This is a really great segment to see these two children working together. I was afraid that Jason wasn't going to get a chance to do anything but David intervened and said, "Give Jason a chance." I thought it was too bad that Brandon was so eager that he had to run around and take off the excess unifix cubes; because I was curious, from an assessment point of view, whether Jason understood that once he had put on all the sticks and they stuck out off the end of the table, he was supposed to break off the extras. But Brandon was so eager he ran around from the other end of the table and grabbed those extras right off. So we don't know whether Jason really understands the concept of measuring.

Classroom Management, cont.

NCREL/IU

Using nonverbal signals helps to communicate to the students that they need to pay attention because there is something important going on. While Brandon and Jason are involved with counting, a boy comes up to their table to get David's attention. The boy is not aware of what is going on and David quickly holds his hand out to the boy as if to say, "Hold on. There is something going on here that can't be interrupted." The boy catches on to this simple hand signal; and, instead of persisting to get David's attention, he jumps right in to help the boys count. This behavior certainly indicates the high level of motivation and interest that permeates this classroom environment, and also indicates the effectiveness of David's consistent use of signals and his emphasis on mutual respect.

In heterogeneous groups it can be very natural for one member to be more dominant than the other. Teachers need to be sensitive to this and help encourage less dominant members to join in. David encourages Jason's participation by requesting that Brandon let Jason add cubes to the stack. After Jason finishes, David tells the boys to count together, then repeats his directions to Jason. This type of directed encouragement is often necessary to help a reticent child become actively involved.

Problem Solving

Diana Lambdin

A nice extension of this lesson would be to give each group of children only 19 or 20 cubes and ask them to go around the room and measure some of these same things that they had measured before. Limit them with the number of cubes and ask them, "Could you provide me with measurements?" They have to use the sticks of 10 repeatedly because they wouldn't have enough to stretch out the entire length. They wouldn't be able to count it from one to however many. They'd have to use more sophisticated number strategies, and that may well be a lesson that would follow this one. That would be more problem-solving oriented. David might have, in fact, right at this point, asked Brandon, "Gee, that was really tough to count. Good for you. Is there another way that you could have done it?" Or he might have even asked him at this point, "What if we hadn't had enough cubes? What could you have done?" Or "What if we'd gotten lost in the middle? Is there some way we could have kept a record so that we wouldn't have to start all over again if you'd gotten interrupted?"

Estimation – Brandon estimates the length of the table to be 97 1/2

Problem Solving, cont.

NCREL/IU

Counting out loud helps provide the needed practice to strengthen children's understanding of numerical order. David has Jason help Brandon count the cubes out loud to help develop Jason's understanding of the order of numbers. As the boys are counting, Brandon carefully places his pencil on each cube they count so they don't lose their place. Also notice what Brandon does when they approach 80. He places his finger on a cube as a place marker so he can keep track of the tens. He uses one-to-one correspondence with the lower numbers, but as the counting gets more involved he incorporates the use of a tens place holder to help him remember where he was at.

David merely observes this process and does not talk with Brandon about the counting strategies he used. This would have been a good opportunity for David to find out from Brandon which methods he used for counting, which methods Brandon thought were most efficient, and why Brandon used the methods that he did. Continuing this thought process in the share circle during Event 15 would contribute to the goal of building a community of mathematical thinkers.

Teaching Strategies

David Burchfield

I like it that Lupe came over to show what he had done, but he was so amazed at the long train of things and what was going on in this counting up in the 70s and 80s that he started standing there counting with them, which was nice. It was a fairly informal time where they could do that kind of thing.

It was interesting to observe the very capable and precise counting that Brandon did, which was very challenging; and this gets back to the idea that this buddying of greater ability and lesser ability is challenging to both children. Brandon was challenging himself totally. He was engaged, he was counting. He counted up to 98 and then corrected himself to 97 1/2. They were involved together. And you can see the thinking on Brandon's face. It was like when he got to that 98, he stretched a little over the end of the table, waited, and then corrected himself.

Teaching Strategies, cont.

David Burchfield, cont.

Jason's number concept was at that point in the year around 2 or 3 or 4. He was being stretched by engaging with a child with greater ability and counting up like that. Although he might not have understood the number 98, he knew it was a huge number and was participating actively. He was very interested in the event. So for him the objective of this activity and working with Brandon would be exposure, socialization, and enrichment. It wouldn't be expecting mastery of the idea of 97 1/2, but being a partner, being communicative and cooperating.

Diana Lambdin

Notice how motivated the children are to do such a big number. A crowd started to gather around the end of the table as they're coming to the high numbers because the children are really excited to be able to deal with numbers of that size. That's where allowing them the openness to choose what they're going to measure really pays off. They can choose the length of a very long table if they like. And that's exciting.

NCREL/IU

As children practice the skill of measuring, they are also incorporating the concept of parts to whole. Children such as Brandon, who understand parts to whole, are able to integrate this concept with the process of measuring and, hence, are well on their way to the concept of fractions. Brandon is also able to reach past his limits because he is allowed the freedom to explore his classroom environment on his own terms.

Jason, Brandon's partner, benefits by being exposed to an advanced concept of measuring. Although Jason is not ready to embrace this concept, he is able to see where the next level will take him.

After Brandon finishes counting the unifix cubes lined up on the length of the table, he announces that the answer is 98. He then pauses, thinks about it, and realizes that the length of the table is slightly less than 98 and comes up with the answer of 97 1/2. David misses the opportunity to question Brandon in order to encourage Brandon's reflective thinking. Had David pursued Brandon's thinking with well-placed questions, he could have prompted Brandon to explore further his emerging concept of fractions. David could have also helped Brandon to mathematically communicate his thought process so Jason could realize how 97 1/2 was derived.

Event 13

Transition – Lights out to signal that share circle will begin in five minutes

Classroom Management

David Burchfield

At the end of every work time, I try to give the kids a signal that in about five minutes we're going to be gathering to share. It's hard for adults, but it's even harder for young children to say, okay time's up, put it up, clean up. It's like, put the brain in reverse. It allows kids to plan the end of their thinking and their work. So that's important; just a little bit of closure time personally in their thinking and their work.

Some people use bells or whistles to try to talk over things. I use the lights for three reasons: One is when we're about five minutes away from the end of a work time; the second is if I need to say something to the entire group; the third is when it gets too noisy or the noise level and communication talking level gets so high that people can't think and work well. The children have the option to go up and turn off the lights, get the class's attention and say, "Look, it's too noisy for me to think." A lot of kids will do that; maybe a third or half of the kids at different times during the year will go up to the lights and turn them out and just communicate to the whole group, "I can't think right now. Could we please use whispers or could we get quieter."

Diana Lambdin

The teacher has a very familiar routine for letting the children know when they have a little bit of time left before they're going to change gears, change activities. It's really important, I think, to give children that up-front notice, rather than just say, "All right, everybody back in your seats now," and then the children don't have time to finish up whatever it is that they're doing and to get themselves adjusted to "Uh oh, we're going to have to do something else." Notice how short this is. He doesn't go on and on and on with directions, but he gives them the most important information about what they're going to do next. The room gets very quiet when he turns out the light. But it's not just the lights out. It's his very quiet, controlled voice and his use of familiar terminology. He tells them, "We're going to come back to *group* and we're going to sit in a *share circle*." I imagine that those two words have specific meaning for this class They can picture exactly what it is that they're supposed to do when they come back together. He gives directions very, very briefly and turns the lights back on to let them continue with their activity. Now they know what is going to happen very soon.

Event 13 cont.	Transition – Lights out to signal that share circle will begin in five minutes
Classroom Management, cont.	
NCREL/IU	Every teacher has their own method of stopping action to get students' attention. It is always best to use a signal that does not require using the voice so you aren't forced to speak over the noise. When the students in David's class see that the lights are out, that signals to them that they should stop what they're doing and watch him. This is an effective method as it quiets the class down. Other methods used to signal that a transition is about to occur are ringing a bell, clapping your hands and having the students echo that clap back, or even raising your hand high and having the students do the same. Most important, David shows his respect for the children's activity and gives them a reasonable time to finish their measurement tasks. Effective classroom managers allow children to planfully terminate their activities.
Teaching Strategies	
Diana Lambdin	We saw Brandon recording some more of his measurements. I thought I noticed that he had written his 97 and a half all in words, which is interesting because the teacher had commented before, "I like the way you've written that," and I didn't know what it was that he had written. They may never have dealt with the notion of notation for fractions but Brandon is using the best notation that he can think of to record it. Children use invented spelling for words that they don't know how to spell. When they have mathematical concepts in mind that they haven't seen in writing before, they do the best that they can to communicate that concept. Brandon would have no way of knowing what our convention is for writing one-half. Why should "1" with a slash and a "2" represent one-half? There's no good reason. But he has the concept of one-half and so he can write the words "and one-half" to represent the idea that he has in mind.

Event 14

Forming the Share Circle – Moving from small-group to whole-group discussion

Classroom Management

David Burchfield

That scene is a transition from activity to sharing. It's getting the kids in a group, and we use that at the end of almost every work time so they are used to it. It's interesting that I said five minutes, and it was probably around a minute and a half or two minutes that I actually gave them to complete their work. If I say five, I usually try and mean five.

I was trying to get the kids in a circle. I do this bottoms legs crossed thing because I don't like to say sit like Indians or Indian style. It seems patronizing or stereotypical. I think it is better to have them sit that way with the papers on the floor because often if you're really trying to do some quality listening or sharing, it drives you crazy when there's noise from papers. It's a time to transition towards the sharing event and get us ready to listen. It's hard to start sharing the message if you start sharing while there's still noise. And for young children it's really hard—maybe it is for all people. You've really got to listen, and you've got to focus and get ready to do what the goal of that time was.

Diana Lambdin

The children know what the share circle is supposed to be. Notice that David turns out the lights again and reiterates the directions for what it is that they're supposed to be doing as they come together. They all gather, and now he gives more specific directions; that is, not only that they're going to share, but that each group is to choose two things to share. Since the groups are mostly pairs, that means that everybody's going to get a chance to share one thing. David has a phrase that he uses to give them the clue how he wants them to sit. He wants them to sit with their legs crossed and so he uses that phrase. That gets them all sitting and at attention, getting ready to communicate with one another. Then, just to cut down on the distractions of other things, he asks them to put all their papers down on the floor and to be good listeners. They must do this frequently because they're familiar with the routine. They're able to form the circle. He has to motion a few children to sit back so that there is a big enough circle, but that's a common routine in the classroom.

Forming the Share Circle – Moving from small-group to whole-group discussion

Classroom Management, cont.

NCREL/IU

Classrooms need to have procedures so the children know the expected behavior and are able to move efficiently from one activity to another. David facilitates this movement by turning the lights out and briefly explaining to the children what will happen next and what they will need to do to prepare for the share circle. By letting the children know what they are expected to do in advance, the children will remain on task while they wait for others to join the circle.

Teaching Strategies

Diana Lambdin

This notion of going off and doing an individual or paired investigation and then coming back to share is very important. You might be tempted as a teacher to cut out the sharing time and to say, "Well, the children have participated in the investigation, and I'll collect the papers and look them over and see what they did." It's really important for them to share their findings and for the children to get a sense of how what they did measures up against what the other members of the class are able to do, and to get an idea of the level of activity in the class, and the level of proficiency. Some of the children who used big numbers here will encourage other children the next time they do a measurement activity to try doing some big things. Hearing the one-half when it gets reported will encourage other children to start thinking about notions of in-between. There's a lot to be gained by the sharing of the results of the investigations, and it's not something that should be short-circuited.

NCREL/IU

Children need instruction that moves between active and passive learning experiences. Here we see David moving the children into a more passive situation as they break out of their small groups and reconvene in a share circle on the floor as a whole group. Share circles serve several purposes. They:

1. Allow children the time to talk about what they discover during the activity.
2. Help the teacher assess each child's understanding.
3. Provide an occasion for the children to communicate mathematically while they demonstrate their understanding to each other.
4. Give children a purpose and a sense of accomplishment in being able to say, "Here is what I did."

Event 15 — Share Circle – Whole-group discussion of measurement results

Assessment

Diana Lambdin

This is the sharing circle. We can be sure that the teacher is not just listening for the children to share any old measurement, but that he's also listening for reasonable answers, for contradictions, and for consistencies among the measurements that they've taken. Some of those things come up. Interestingly, it's the children themselves who point them out. "Well, we measured the chart, too, but we got something else!" We can see that they do expect that accurate measurement will result in the same number for the same object. I think he could have made even more of a point of that concept. We hope that we get the same numbers each time we measure, and, if several of us measure the same thing, we get close to the same numbers. If we get a totally off-the-wall answer, such as that the bunny is 97 unifix cubes long, then that would be questioned.

When Jason and Brandon report and Brandon does all the talking, David asks Brandon a little bit about why he said 97 1/2, although he had observed that entire exchange in the classroom. Not knowing the children personally, I wonder why he let Brandon speak for Jason and didn't encourage Jason to do more of the talking on his own. We heard Jason talk earlier in the tape when he was putting down his lunch box and saying they were going to go over and measure the blocks, so that I know that he can talk.

NCREL/IU

You will notice that when David questions the children he often begins his questions with, "How did you get...?" or "How did you determine... ?" When you phrase questions this way, you are prompting the children to verbalize their thought process. Not only do these types of questions help the children to clarify their thinking, but it also helps the teacher determine their level of understanding.

Classroom Management

David Burchfield

The sharing at this point is interesting because I'm trying to guide it in such a way so that each child in the pair gets a turn to say something.

Diana Lambdin

When he turns to Felipe and Lupe, I wonder again why Lupe doesn't do any talking. One of the boys reports for both the others.

NCREL/IU

You can see the excitement in the children's faces as they share their results. David lets the children know how they have done through verbal praise and facial expressions.

Event 15 cont.	Share Circle – Whole-group discussion of measurement result
Problem Solving	
David Burchfield	It's interesting that the kids were stretching themselves. They were showing the longest things that were 70, 80, 90 unifix cubes versus something that was 3. Kids were using something that was a half, which I think is very interesting because I think children naturally stretch. The environment is set up so that there is this sense of, "Go for it, challenge yourself, take risks." They naturally want to demonstrate, stretch, and show quality. I think it's different than if I had said they needed to do a certain thing and I was looking for a certain answer. Then it would have been boring and they would have only met my standard, whereas here they stretched beyond what I would've even come up with. Part of being expressive in your language and learning how to talk about things appropriately is learning how to get the meaning and the information across without giving too much detail and without thinking there is only one way to do it. What I do is question when I need information or if I wonder if the child understands or really knows what they did. So it would be for those reasons that I asked them to name the dimension measured or to name the unit of measurement.
Diana Lambdin	One child reports that he measured the tambourine and that it was 14. There's a missed opportunity to ask what the child measured on the tambourine. In fact, he could have asked the rest of the class what other things might have been measured on the tambourine and how might they measure the tambourine. They might have measured its depth, which would be very small. Or they could have measured it's circumference, which would not be easy with unifix cubes, but the children might have been able to come up with techniques. David could have pulled out the tambourine and given a two-minute problem-solving discussion that would have been rich. Maybe that could be followed up the next day instead.
Teaching Strategies	
David Burchfield	Lauren, who originally was having confusion over the standard she was using, ended up correcting herself, which is neat. That showed she was cognizant of the idea that I was trying to get across earlier.

Teaching Strategies, cont.

David Burchfield, cont.

The share circle is not just a brag circle. It's a time to talk. I would say it's a time to get together and share what we were doing during work time. It could be saying, "I have a problem with such and such." One of the nice things about a classroom that is not competitive is you take risks, you're bragging on each other. It's a time to talk, not just get at strategies.

One of the things I found interesting was the instances when certain children couldn't read the information. This is mid-first grade and some of the reading they had recorded was a challenge, so a few of the kids needed some assistance. But it wasn't embarrassing. The child next to them would whisper something to them; they would assist each other. I like that a lot. It's a cooperative sense, not threatening.

We clarified that it's important to describe whether it was height, across, tall, long, whatever. After all, the whole goal of this is meaning and trying to get at making sense of it. And if you can't make sense of it as a listener, then the person who's telling needs to give a little bit more information.

Diana Lambdin

He may be a more formal type of teacher but he shares his delight with a very warm smile and with comments like, "Wow!" or "Boy, that was terrific!"

David starts asking a lot more questions about how long, tall, high, and it may be that this was his plan all along or it may be that he hadn't thought carefully enough about this issue. He could have dealt with reporting dimension up front. We might need to ask the teacher what the plan was at the beginning.

Notice that here's another advantage of having the children work in pairs. As they come back to report and they have difficulty with reading what they've written or with deciding which thing to report on, there are two of them to give input. They do help one another by pointing out what they wanted to report about or saying, "No, no this is what we found." The pairs worked very well there.

Share Circle – Whole-group discussion of measurement results

Teaching Strategies, cont.

Diana Lambdin

David deals with the issue of accuracy. He says something like, "Later on in your life, you're going to realize that we want different people to get the same number when they measure the same thing." I don't know why it has to be later on in your life. I think it could be right now. I hope that if several groups measured the cage, they got close to the same number. This is what we call accuracy in measuring and if your numbers are way off, something went wrong. David doesn't need to pin the blame on anybody for having different numbers, but it would be important to really make the point that we expect the numbers to come out the same and that we hope for a pretty high degree of accuracy when measuring. One way of checking that is by repeated measurements and looking for the reliability of the measurements. I don't think it's something that needs to wait until later on in your life. The children seem already aware of the need for accuracy though when they brought up on their own, "Gee we measured the chart and got a different answer."

Some of the children are not clear what David means by tall. Felipe corrects himself anyway. He says, "Tall" and then, "No, I mean across." Maybe he understands the word but he wasn't immediately prepared to answer that question. He hadn't thought about "Well, what was it that I measured?"

There's no need for the children to say "cubes." That's an artificial constraint that we put on them in the school situation—to always report what it was when everybody was using cubes. But I think that it would have been useful to say, "We measured the height of the chart and it was such and such."

They've shared the results of the activity, but I notice that he doesn't recap what they learned from this activity. He might do well to say, "Well, what did we learn from this activity? We learned that it's important to put the cubes right at the edge when we're going to measure; we learned that if several of us measured the same thing, we hope that we get close to the same answer; we learned that we can measure some very small things and some very large things with the unifix cubes, and sometimes it doesn't come out even and we get halves."

Share Circle – Whole-group discussion of measurement results

Teaching Strategies, cont.

NCREL/IU

The share circle is a wonderful way for the children to come back together to synthesize the previous activity. It is interesting to note the respect each child demonstrates while his peers are speaking. For example, no one ever laughs or makes derisive comments when someone has difficulties reporting their results. All children have the opportunity to speak and have the freedom to disagree with a response if they're able to justify their solution. At one point a group of three boys measured the same item that another group measured but the two groups had different results. This discrepancy encourages the groups to conjecture, explore, and reason logically to discover why the results were different. Through David's questioning technique, the children determine that the discrepancy occurred because both groups measured different attributes of the same item. As pointed out in Event 8, to avoid confusion, it is important for children to use precise mathematical terms (how tall, how long, how wide) to describe how they measured.

When two groups measured the same item and came up with the same results, David tells the children that this is important because later on in their lives they will need to verify their information. While this statement is true, children this age are generally egocentric and usually are not able to conceive of a life or time other than the present. David could have related the need for precise measurement to their present situation. For instance, he could point out the need to measure equal distances between bases if they were to play a fair ball game. Mathematical situations that relate to a child's environment become relevant and real world to them.

Event 16 End – Collecting record sheets

Assessment

David Burchfield

When we have an activity, I don't assess and have a product for everything we do; you can't keep that much information. Usually two or three times during a unit I'll xerox something to put in their work file, which I keep. The assessment is more an interactive than product assessment. It's more listening and responding again. Even in the share circle, it's more of a sense of responding to their thoughts than it is looking for a particular answer.

Diana Lambdin

David says that he's going to collect their work to share with parents and I think that this is important. Why did he have them bother to record things? Well, because it was useful to see how well they're able to handle the notation and the writing. It also shows the parents not only the skills that their children have developed, but the types of activities that go on in this classroom. The parents see more than the typical textbook worksheets. Here is some physical evidence of the investigations and the orientation that David has for his classroom. Notice that he needs to make copies so that he'll have one for each child's folder because they worked in pairs. You need to think about that ahead of time if you are going to keep them for the parents.

NCREL/IU

Keeping a portfolio of student work is a good way to assess and keep track of student progress. David has the children turn in their recording sheets so he may xerox them to put in their folders. These folders will be shared with the parents so they, too, can see the progress their children are making. He emphasizes the children's performance, not their grades. Portfolios are also helpful in providing future teachers with information regarding children's strengths and weaknesses.

Classroom Management

David Burchfield

I like what I saw in the kids. You try your best as a teacher to develop this sense of community. We're here to learn. At the beginning of the year I set up the idea of why are we here? Well, we're here to learn. That's the major overall goal of our classroom. And everything we do is learning, whether it's learning about numbers, writing, reading, or learning how to get along, or whatever. If the task was totally teacher-directed in this instance, then I sometimes sense that kids get up and go, "Uh, we're done" and then go crazy.

Classroom Management, cont.

Diana Lambdin

At the end of this lesson it's interesting to observe that when we were done, the kids starting picking up the unifix cubes. They started getting up slowly and they were still talking and then moving on to the next thing. Because they had ownership, because it had been meaningful, and because it was a challenge, they didn't want to let loose and run around the room and act crazy. They know that we were there to learn, that we had done our job well, and that we're moving on calmly to the next thing.

David gives some closure to the activity by giving some directions for how they're going to break up and when and where they're going to reconvene. He wants the papers passed to Mrs. Lippe so that he can collect them and he assigns a few students to collect the cubes. It appears that they have the next three minutes to wind down and relax from this activity.

NCREL/IU

Each student in the class should have a responsibility for maintaining the appearance of the classroom. Procedures for cleaning up should be established in the beginning of the year so children know what is expected of them throughout the year. The class starts putting away the materials they use. This seems to be a standard classroom practice because the children know their roles and get right to work. They know that the room must be put to rights before the next activity begins.

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