Teacher Track: Classroom Connections

Day 1: Math in Routines

Agenda

- Ice Breaker: Rekenrek Attendance
- Video Analysis: PreK Milk Count routine
- Calendar Routine: Text Rendering Activity and Discussion
- Mathematically Powerful Routines
    - Linear Calendar
    - Counting Days of School
    - Counting Jar
- Reflection

Calendar Time for Young Children

Good Intentions Gone Awry

Sallee J. Beneke, Michaelene M. Ostrosky, and Lilian G. Katz

Heather, a student teacher, watches as Ms. Kelsey begins calendar time with the 4-year-olds seated in a semicircle on the rug. "What day is it today?" Ms. Kelsey asks, gesturing toward the large calendar on an easel next to her. When no one responds, she asks, "Well, what day was it yesterday?" The children show little enthusiasm for the exercise, but finally Mindy offers, "Yesterday was Friday!" Ms. Kelsey says, "No, it wasn't Friday, Mindy. Does someone else know what day it was yesterday?" Terrance suggests, "Wednesday?" to which Ms. Kelsey responds, "Right! And if it was Wednesday yesterday, then what day is it today?" Several wrong guesses later, the correct answer emerges.

Ms. Kelsey then asks Terrance to cross out the corresponding date on the calendar. When he hesitates, she prompts, "Just look at the date we crossed out yesterday." Terrance still seems confused, so Ms. Kelsey points to a box and says, "That's the one for today." Although the children are quite restless and appear indifferent to the solution to the date problem, Ms. Kelsey succeeds in getting them to say in unison, "Today is Thursday, February 15th."

Shortly after large group time, Heather meets with her faculty supervisor, who suggests that when helping the children get ready to go home, Heather might casually ask them what day it will be when they get home. She also suggests that when a child gives the correct answer, Heather should ask, "Are you sure?"

Later, following this advice, Heather finds that about a third of the children do not know what day it will be when they get home. Among those who get the day right, about half are unsure of their answer. Heather wonders about the calendar activity. After all, it is February, and calendar time has been part of the children's daily routine since September.

Why do the children struggle to answer Ms. Kelsey correctly, when they have participated in this routine for months? What is the long-term impact on children when they engage regularly in an activity they do not fully understand? Here is a fresh look at calendar time in light of what we know about child development and best practices.

Young children's development of a sense of time

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Adults use calendars to mark and measure time, such as scheduling appointments, remembering birthdays, and anticipating upcoming special events (spring break, a basketball tournament). However, if we look at the development of children's understanding of time (sometimes referred to as *temporal understanding*), there is

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little evidence that calendar activities that mark extended periods of time (a month, a week) are meaningful for children below first grade (Friedman 2000). However, there *are* some temporal concepts that preschoolers can grasp in the context of their daily activities—concepts such as *later*, *before*, and *after*.

Barriers to meaningful participation

To participate meaningfully in calendar activities, young children must understand that time is sequential. The sequences include yesterday, today, and tomorrow; morning, afternoon, and evening; Sunday, Monday, Tuesday, and so on. Children also must be able to conceptualize *before* and *after* and think about future and past events. Three-year-olds typically "have established object permanence and can recall past events, even though they do not understand the meaning of the words 'yesterday,' 'today,' or 'tomorrow'" (CTB/McGraw-Hill 2002, 9). Thus, young children can talk about things that have happened or will happen, but they cannot yet understand or talk about these events in terms of units of time (days, weeks) or sequence. This child development knowledge draws into question the usefulness of calendar activities for children under age 6.

Distance in time

Calendar use requires children to understand not only concepts such as *before* and *after* but also the relative lengths of time or distance of past or future events from the present (Friedman 2000). For example, how far away is October 30 when today is October 5? How long is the weekend? Preschoolers cannot usually judge such distances or lengths of time. A 4-year-old who learns that there will be a field trip in five days will not judge the temporal distance of this event any differently than if he were told it is in eight days. In fact, it is difficult for preschoolers to judge length of time within a given day (with hours as the unit of time), such as "in two hours" versus "in four hours." Perhaps this is the reason children on a car trip repeatedly ask, "How long until we get there?"

According to Friedman (2000), the ability to judge the relative time from a past event or until a future event in terms of the calendar year is not in place until sometime between 7 and 10 years of age. The following anecdote about 6-year-olds' attempts to understand time concepts associated with birthdays and age illustrate Friedman's point.

As Joey's grandparents arrive for his birthday, Joey runs to greet them, saying, "I can't believe I'm gonna be 6." "So, you're going to be 6. Six what?" his grandmother asks. Joey responds, "It's my birthday. I'm gonna be 6." "Yes, I know," she replies, "but six what? You're not six books." At that point Joey's 9-year-old brother whispers in his ear, "You're gonna be 6 years old, dummy!" and Joey says, "I'm gonna be 6 years old."

Three days later, as Joey's friends assemble for the traditional noisy birthday party, a discussion begins about who is already 6 and who is not. Marta states, "Well, I'm 6½." Joey asks her, "Six-and-a-half what?" Marta responds, "I don't know." Another child says to 6½-year-old Marta, "Wait a minute. When were you a baby?" She hesitates and then answers, "I don't know, maybe 10 years ago."

True understanding of dates and the calendar comes with maturity. Given the above information on the level of thinking required to grasp the time concepts of the calendar and the developmental abilities of young children, teachers may want to reconsider the calendar routine and their expectations for young children's comprehension.

Teaching using the calendar—or not?

Early childhood educators may use the calendar to teach concepts other than time, including numeracy, vocabulary (*month*, *year*, *weekend*), sequencing (yesterday, today, tomorrow), and patterning (Monday, Tuesday, Wednesday). Additionally, as children attend to the visual calendar,

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teachers may hope they will learn numeral recognition and one-to-one correspondence. Early childhood specialists have cited numbers, spatial reasoning, patterning, logical relations, measurement, and early algebra as key components of young children's mathematical growth (for example, Greenes 1999; NCTM 2000). However, most 4-year-olds are not ready to grasp the complex concepts involved in dates (Etheridge & King 2005).

Math concepts

Learning experiences that center on mathematical concepts should not only be enjoyable and meaningful but also direct children's thinking toward, and focus it on, important mathematical ideas (Trafton, Reys, & Wasman 2001). Giving preschool children opportunities to explore and experiment individually with math concepts, using concrete materials with a responsive adult to question and guide learning, is likely to be more meaningful and beneficial than having young children participate in a whole group discussion of such concepts centered on the calendar.

For example, a teacher can help children notice patterns in the environment and in their work and explain the process of patterning both at circle time and individually. A teacher might join a child who is stringing beads and say, "I think I will make a pattern with my beads. My pattern is blue, yellow, red; blue, yellow, red. What kind of pattern can you make with your beads?" These approaches can help children build their own patterning abilities.

Other knowledge and skills

Many teachers use calendar time to teach skills unrelated to math, such as colors, letters, emergent writing, and social skills. While each of these concepts and skills is important for young children to learn, the calendar routine is not the most useful format for teaching them. For example, it is difficult for teachers to individualize instruction to meet the diverse needs of young learners during a large group activity such as calendar time.

A poster with illustrations or photos of the day's activities in sequence can be helpful for all young children.

Better alternatives at group time

If focusing on the calendar is not an appropriate way to introduce young children to time concepts, numeracy, and the other concepts mentioned above, then what are some better ways?

The following evidence-based practices are likely to be more effective than calendar activities in presenting time concepts to young children.

Picture schedules

Although young children have difficulty judging the length of time between events (for example, how long the time between snack and outside play will be), they can understand a sequence of events (for example, snack comes after circle time). Young children generally have a strong sense of narrative and the way a story progresses. Pictures illustrating the schedule of class activities are often recommended for children with particular disabilities. Similarly, a poster with illustrations or photos of the day's activities in sequence can be helpful for all young children.

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Classroom journal

Using a digital camera, the teacher can take frequent photographs of classroom events, projects, or field trips, then invite the children to help select photos for a classroom journal. Attach the photos to a dated page (one photo per page or multiple photos on a page) or tuck them into a plastic sleeve. Post or display them in a designated place—on a wall or bulletin board or in a binder—to clearly reflect the sequence of activities: "On Tuesday, we went to the park, we made pancakes, and we read *Pancakes, Pancakes!* by Eric Carle." As the children add new pictures

chronicling recent events, they can revisit and discuss past shared events.

Along these same lines, the teacher can collect samples of children's work in a notebook as a visual record of shared events. Children can take turns contributing work to this community notebook. When teachers encourage children to tell peers or their families the story of their project, the children strengthen their understanding of the way an event unfolds, with the various activities taking place in a time sequence.

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Documentation displays

Displaying documentation of shared class events can lead to meaningful discussions that involve time-linked vocabulary. For example, when looking at a documentation display about the class construction of a giant papier-mâché butterfly, one child said, "See, there's the butterfly we made that other time." Her teacher responded, "Yes, we made the giant butterfly two weeks ago. Here [pointing to a photograph on the display] is a picture of the frame we built the first day, and the picture next to it shows you adding the papier-mâché on the second day."

Linear representations

Linear representations also can help children begin to understand and conceptualize that a day is a unit of time and talk about it with increasing clarity. For example, to count the number of days they have been in kindergarten, children can add a link to a paper chain each day, or number a pattern of colored Post-it notes and place them on the classroom wall, or add a Unifix cube to a stack of cubes. The teacher can emphasize time-linked vocabulary, such as *before*, *after*, *later*, *earlier*, as the children add the new link. Unlike calendars, linear representations do not require the left-to-right orientation.

Games

Games are another way for children to begin to get a feel for the length of various units of time and the vocabulary associated with them. For example, children might guess how many seconds it takes to walk from one side of the playground to the other, and the teacher or another child can time it with a watch. Or a teacher might ask the children to guess how many minutes it will take for a snowball to melt indoors and then time it with a clock. They might guess how many hours it will be until story time, tally the hours as they pass, and then compare the result with their estimate. These experiences with units of time (seconds, minutes, hours) can lead to discussions about points in time during the school day and the relative distance in the future of these points in time. For example, the teacher might say, "We are going to the library at nine o'clock, and we will go outside at ten o'clock. Where are we going first?"

Project work

Project work, in which children actively engage in ongoing investigations of events and phenomena around them, is another way to give children opportunities to acquire many concepts and skills related to time (Helm & Beneke, 2003). In project work, calendar concepts are useful rather than ritualistic in nature. Project work lends itself to planning future events and keeping a record of events that happen over time. For example, in a mixed-age preschool, the children investigated eggs. They incubated mallard duck eggs, and each day they added to a tally of days until the ducklings would hatch. As children plan for investigation and reflect on what they have learned and when they learned it in the meaningful context of a project, they naturally begin to develop a sense of the relative lengths of time in the past and future.

Intellectual development and calendar time

A teacher's actions can enhance or inhibit young children's learning. Communication, classroom support, activities, and interactions all play a part. If young children participate frequently in activities they do not really understand, they may lose confidence in their intellectual powers. In this case, some children may eventually give up hope of understanding many of the ideas teachers present to them. Certainly all children will experience some degree of not fully understanding activities at some point.

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However, in such cases it is helpful for the teacher to reassure learners that fuller understanding will come and that it often takes practice to master a concept, and to indicate in other ways that feeling "out of it" happens to us all sometimes and will be overcome. "Curriculum goals must be both challenging and achievable for all children . . . one size does not fit all. Children will learn best if curriculum content connects with what they already know and have experienced, while introducing them to important new ideas and skills" (Hyson 2000, 61).

In a joint position statement on best practices in early childhood mathematics learning, NAEYC and the National Council of Teachers of Mathematics (NCTM) (2002) stated,

> It is vital for young children to develop confidence in their ability to understand and use mathematics—in other words, to see mathematics as within their reach. In addition, positive experiences with using mathematics to solve problems help children to develop dispositions such as curiosity, imagination, flexibility, inventiveness, and persistence that contribute to their future success in and out of school. (p. 5)

Lengthy daily calendar sessions in which a teacher expresses the expectation that young children will understand the workings of a calendar run counter to this position. Teachers who intend to keep calendar a part of their daily classroom routine will be more effective if they develop ways to incorporate the calendar that require little time and reflect young children's limited development of time concepts.

Conclusion

As teachers reflect on their practice, they may experience an inner conflict in terms of what they believe about children's development and how and what they teach. Understanding how children learn should enable teachers to focus on calendar-related constructs such as patterning, sorting, and seriating during more natural and appropriate routines. In fact, many teachers will likely realize they already address these fundamental concepts during other parts of the classroom day.

As we return to the opening vignette, considering the information in this article, the discussion Ms. Kelsey has with her class might look something like this:

As Heather watches, Ms. Kelsey addresses the 4-year-olds seated on the rug in front of her: "It's time for us to add another link to our chain. Who would like to attach the link that stands for today?" Mindy volunteers, and Ms. Kelsey says, "Wonderful! Pick someone for your partner, and you two can take care of that." Mindy holds out her hand to Ginelle, and Ginelle joins her in attaching the latest link.

"Now, let's look at our picture chart. Who can tell me what we are going to do after circle time?" Terrance offers, "We're going to the library." Ms. Kelsey responds, "Right! Does anyone remember what are we going to do after that?" Althea enthusiastically states, "We're going out for recess!" Ms. Kelsey cheerfully responds, "Yes, that's right, Althea."

Ms. Kelsey then says, "Mindy and Ginelle have added a link for today to the paper chain. How far does the chain reach, now?" Ginelle responds, "It's almost to the window. It's really getting long." Many of the children voice their agreement.

Not long after circle time, Heather's faculty supervisor suggests that when she helps the children get ready to go home, she might ask them what they are going to tell their parents they did that day at school. Most of the children plan to tell their parents about the day's sequence of activities, and when Heather prompts them with, "Are you sure?" several children refer to the picture chart to verify their statements.

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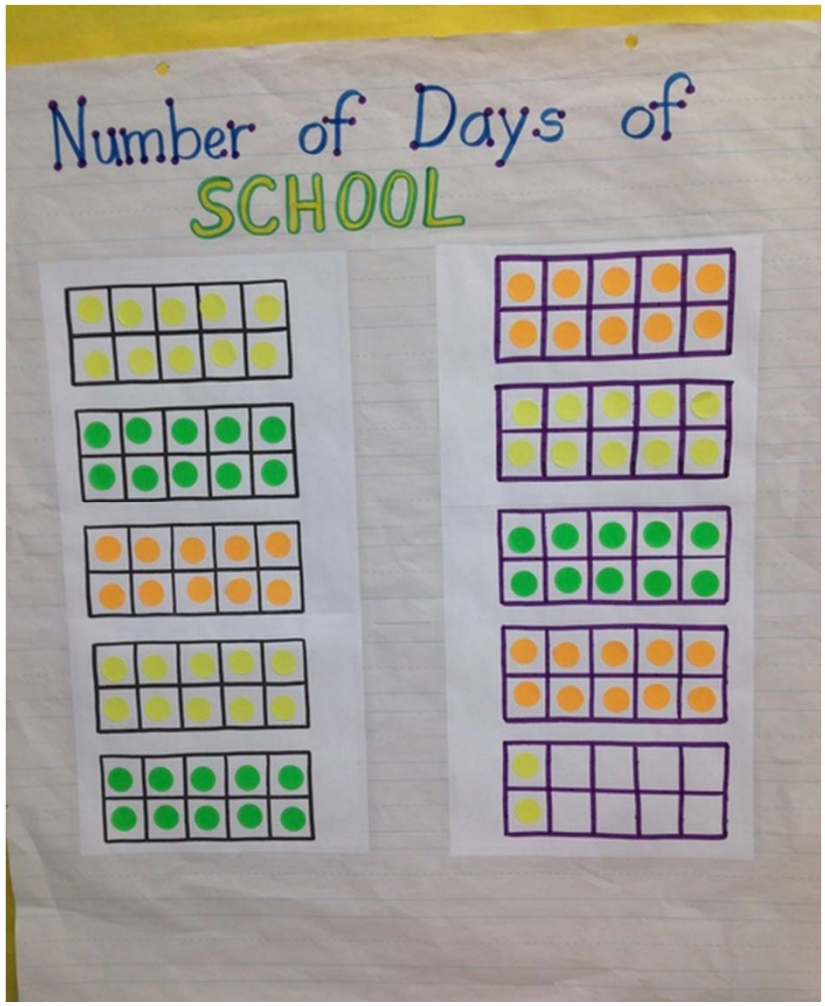
Rekenrek Attendance Chart

Counting Days with Ten-Frames



Linear Calendar

Linear Calendar

Classroom Connections: Reflections

Day 1: Math in Routines

Because of this session, my teaching will be informed, and I will…

Start doing ––

Keep doing ––

Stop doing ––