Dennis-Yarmouth RSD

Instruction Office Newsletter

Six Important Common Core Shifts in Math – (Originally titled "Teachable Moments in Math")

In this *Educational Leadership* article, Linda Griffin and David Ward (Lewis and Clark University) say that successful implementation of Common Core math standards hinges on teachers understanding five significant shifts:

- *The equal sign* (1.OA.D.7) – A common student misconception is that = is shorthand for "the answer is" – a prompt to solve the problem and write the correct answer. The meaning that students need to internalize in the early grades is subtly different: = expresses a relationship between quantities on either side, shorthand for "is the same as." This lays the groundwork for future mathematical learning, especially in algebra ($x + 5 = 11$), opening the door to new strategies for solving complex problems. Griffin and Ward suggest that elementary teachers explicitly teach several synonyms for the equal sign (*is the same as, has the same value as, balances, is worth the same*), use a drawing of a balance scale or teeter-totter as a visual reminder, and vary the position of the solution blanks in number problems.

- *Cardinality* (K.CC.B.4) – A kindergarten girl is asked to count five cubes and correctly touches each one, saying, "One, two, three, four, five." The teacher can tell if the child understands cardinality by asking how many cubes there are. If the child says "Five," she understands. If she starts counting again, she hasn't yet grasped that the last number has a special meaning – the number of objects in the set. This gives meaning to the counting process and opens the door to addition and subtraction solutions. It's important for primary-grade teachers to follow up counting tasks by asking

Important Dates:

- **100th Day of School**
  - **February 26**

- **State of the District Meeting**
  - **February 25**

- **Read Across America Day**
  - **March 2**

- **Early Release Days**
  (PK-5 – Parent Conferences &
  6-12 – Professional Development)
  - **March 10 & 12**

- **Mentor Meetings**
  - **March 16**

- **All Day Professional Development**
  - **March 20**

- **Project Success - New Mentor Training**
  - **March 28**

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how many – for example, "How many children ordered hot lunch today?" Teachers can also encourage students to use counting as a strategy to solve more-complex problems – for example, "How many would we have if we combined these two piles of cubes?" or "How many pencils would you have if I took two out of your basket?"

- *Properties* (in several Common Core grade 1 and 2 standards) – Griffin and Ward suggest putting less emphasis on terms and abstractions (commutative and associative) and more on using them to make good strategic decisions to solve problems – for example, rearranging the numbers in the problem 6 + 7 + 4 into 7 + 6 + 4 makes the problem much easier to solve (adding 6 + 4 to make ten and then adding the 7). "Students who develop a habit of mind for problem solving that includes reflection and planning ahead will be able to use this skill to great advantage throughout their mathematical careers," they say. "Students without this capacity have a tendency to plunge headlong into every problem without first taking a step back to identify the goal and consider multiple solution paths." One teaching strategy to build this skill is giving students several problems with the same number combination reversed (for example, 5+2 and 2+5) and drawing attention to students who see that they have the same value, providing a shortcut in future problems with bigger numbers.

- *Composing and decomposing* (these occur in six Common Core K-2 standards across three domains) – "Students who develop flexible thinking about numbers early in their schooling are poised to develop complex mathematical thinking as they progress through the grades," say Griffin and Ward. "Students who can decompose and recompose numbers see many options when presented with a challenging computational problem." For example, 27 + 19 becomes much easier when a student sees the three tens or the two twenties or the 25 and 10. Teachers should frequently get students breaking numbers down to simpler pieces and

ask questions like, "If you take my number apart one way, you can see 25 and 25 and 5. If you take it apart another way, you can see 40 and 15. What's my number?"

- *Unknowns* (1.OA.A1) – A standard results-unknown problem – *Dina had 12 marbles. She gave her cousin 7 marbles. How many marbles does Dina have left?*

  – lends itself to students using cubes, drawings, or fingers to solve. But putting the unknown in a different position makes the problem more complex and challenges students to generate and apply more-sophisticated problem-solving strategies:

  - *Dina had 12 marbles. She gave her cousin some marbles. Now Dina has 5 marbles. How many marbles did Dina give her cousin?*

  - *Dina had some marbles. She gave her cousin 7 marbles. Now Dina has 5 marbles left. How many marbles did Dina have at the start?*

Griffin and Ward suggest that teachers regularly give students problems with unknowns in varying positions and work on developing robust solution strategies.

"Teachable Moments in Math" by Linda Griffin and David Ward in *Educational Leadership*, December 2014/January 2015 (Vol. 72, #4, p. 34-40), http://bit.ly/1zFhK3S; the authors can be reached at lgriffin@lclark.edu and davidward@lclark.edu.
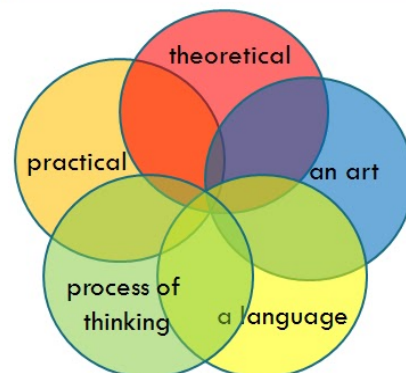
Finding Time for Interventions

How do I find the time to do interventions? When will I do this and also keep up with the pacing of the curriculum?

One thing all teachers can agree on is that time is a limited commodity, especially given the depth and breadth of the standards they teach. In fact, many educators say there is too much to teach, making it nearly impossible to find the time needed to intervene and extend the learning for students. This problem is compounded when teachers are expected to follow rigid pacing guides with prescribed activities and detailed lesson plans. Unfortunately, these documents rarely allow for the possibility that students may need pre-teaching of prerequisite skills before they can move on to the learning target in the pacing guide for that day. Teachers need to teach the students that they have in their class, not the ones that the pacing guide was written to address.

The reality is that the currency of education is time. So how does a teacher find the time to pre-teach prerequisite skills, teach the required curriculum, intervene, and extend for every student? Because interventions and extensions are part of the teaching and learning process and not separate from our work, how do teachers do it all?

One of the most effective ways to gain time in the curriculum is to administer short pre-assessments on the skills needed to master the new standards to determine what students already know and what may be a sticking point for them. This serves two purposes:

1. It allows you to treat the curriculum unequally.
2. It provides information necessary to differentiate for individual students and small groups.

Without the information obtained from a short pre-assessment, teachers typically approach each unit in the same manner, teaching all of the standards and targets as if the students have no prior knowledge. Instead when a pre-assessment is administered, it allows the teacher to make critical decisions about what to spend more or less time on in the unit. It also allows for pre-teaching to specific students before whole-group instruction so that all students are actually able to keep up during the whole-group lesson. These students often need vocabulary instruction and/or other prerequisite skills to learn the expected content.

A helpful resource to guide teams as they plan an upcoming unit is the Protocol for Team Analysis Prior to Teaching a Unit. Teams use this protocol to review prior common assessments for the upcoming unit and identify prerequisite skills or vocabulary that may need pre teaching. This information is used to plan specific steps to address these skills and vocabulary.

In addition, assessment research is clear that the checks for understanding that teachers do during daily instruction are the most effective ways to respond to student learning. This in-the-moment data allows teachers to proactively meet the needs of learners before they start to struggle. Checking for understanding saves time by minimizing the need for remediation later.

A careful analysis of how teams use time is required to meet all of these demands. Consider these team questions:

1. How do we spend the limited time we are given?
2. Is this the right lesson for these students right now?
3. Given the school-year time frame, is this learning experience worthy of the time it will cost?
4. Is there another way to approach this learning that might work better for these learners or be more efficient in moving them along?

As teams discuss these questions and use the information from pre-assessments and checks for understanding, they are gaining the time needed to strategically target specific student needs before, during, and after instruction.

Protocol for Team Analysis Prior to Teaching a Unit

1) Review of prior common assessment for this unit:

- Based on analysis of the results from common assessments from last year, we have identified the following area or areas in which students in general struggled.
- We believe a primary cause of their struggle with this content was:
- We have identified the following action plan for improving student achievement as we teach this unit:
- We have established the following SMART goal for this unit to improve upon last year's results:

   (For example: **Last year** ___ % of our students met or exceeded our proficiency target on the following essential skill/standard on our team's (list common assessment here) administered at the end of the unit: _____.
   SMART GOAL: at least ___ % of this year's students will meet or exceed our proficiency target on the assessment this year.)

2) **Identifying prerequisite skills/vocabulary for this unit**

- We have concluded that students need the following skills/vocabulary to be successful in this unit:
- Our plan for gathering evidence about student proficiency in prerequisite skills/vocabulary and addressing the needs of those who lack skills is as follows:

3) **The administration could help us achieve our goal in this area by**:

Every Child an Engineer (Originally titled "Engineering for Everyone")
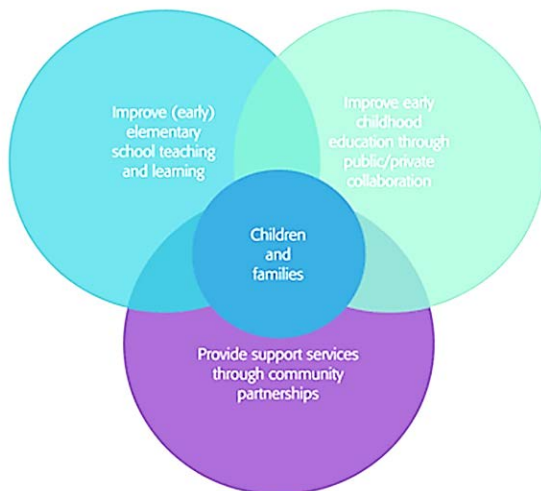
In this *Educational Leadership* article, Christine Cunningham and Melissa Higgins (the Engineering Is Elementary program at Boston's Museum of Science) suggest six ways schools can get all students involved in the E in STEM. "Making engineering instruction more inclusive is important," they say, "because women and minorities are disproportionately underrepresented in engineering fields in the United States."

- *Set engineering in a real-world context* by weaving it into a news item, problem statement, or fictional story. For example, *Lerato Cooks Up a Plan* is a story about a girl in Botswana who improves the workings of a solar oven to reduce the drudgery of gathering firewood. After reading the story, students engineer the insulation of their own solar ovens (made from a shoebox) and conduct a controlled experiment on how successful they are.

- *Show how engineers help other people, animals, and the environment* – for example, constructing an electrical circuit that will sound an alarm when an animal's water trough is empty.

- *Design open-ended activities with multiple solutions*. The idea is to foster creativity, encourage risk-taking, and invite exploration and sharing of original ideas, say Cunningham and Higgins. An example: challenging students to design a flexible knee brace that allows an injured person the normal range of motion, using only jumbo craft sticks, rubber bands, string, felt, craft foam, fabric, and cardboard.

- *Value mistakes*. "Engineering activities should embrace failure and cast it as a learning opportunity," say Cunningham and Higgins. "We should communicate that students don't fail, the *design* fails. In our experience, students welcome the opportunity to improve their designs."

- *Foster collaboration*. Competitive environments are discouraging for a significant number of students, while cooperative activities draw them in and show their areas of strength. One group activity in the Museum of Science program has students designing a parachute that will float down as slowly as possible. "Of course, students, like adults, need to learn *how* to work in teams," say Cunningham and Higgins. "Teachers should actively encourage students to share their thoughts, consider other people's perspectives, argue from data and evidence, and compromise to select the best ideas."

- *Use readily available materials* – for example, using water, salt, and flour to make play dough.

A Birth-to-Third-Grade Strategy for Closing the Achievement Gap

THE PRIMARY YEARS AGENDA

vocabulary instruction, and development of social- emotional skills. To address these needs, schools, districts, and states need to improve curricula, formative assessments, and student progress monitoring mechanisms, taking into account how young children best learn and the full range of development domains: cognitive development and general knowledge, social and emotional development, language and communication development, approaches toward play and learning, and physical development and well-being. Importantly, they need to enact these improvements by supporting teachers through professional development, coaching and professional learning communities, using them to improve developmentally appropriate teaching and learning in classrooms.

it's important to note that Dennis-Yarmouth Regional School District has already addressed a number of these needs with the implementation of Tools of the Mind in Kindergarten, the Lesley Literacy Collaborative at grades K-2,and the curriculum mapping and DDM work currently being done by PLCs at every grade level.

"Gaps between low-income and middle-class children appear early and increase over time," says Massachusetts-based early learning expert David Jacobson in this *Kappan* article. "Addressing large gaps requires improving the quality of services for children at each level of development and integrating and aligning these services in order to have the most effect." He makes the case for a comprehensive program that integrates services from birth through third grade and points to two districts, Montgomery County, Maryland, and Union City, New Jersey, that have pioneered this approach and seen marked improvements in student achievement and reductions of racial/economic disparities. The strategy has three phases:

• *Age 5-9* – The primary grades sometimes suffer from relative neglect because there isn't state testing at this level, says Jacobson. A grant-funded study done in Massachusetts a few years ago created vertical preK-3 teams in over 40 districts to conduct needs assessments of the early learning pathways in their districts and develop strategies to address high priority needs. Their research identified the following range of important needs: gaps in expectations between preK and kindergarten and between kindergarten and grade 1; misaligned curricula and assessments; lack of consistent instructional approaches across the early grades and inadequate attention to oral language development,

• *Age 3-5* – In many communities, preschool education is a hodge-podge of family day care, community-based preschool centers, Head Start, and district programs, says Jacobson. While K-12 educators have a lot on their plates, it's very much in their interests to join with state and other agencies to ensure that children enter kindergarten and first grade ready for school success. This means monitoring and improving the quality of existing preschool programs, promoting training in best practices (including joint professional development with district teachers and leaders), articulating curriculum expectations aligned with primary-grade Common Core standards, and establishing a climate of mutual respect and two-way collaboration.

• *Birth to age 3* – Services at this level include home visiting, parenting classes and supports, and quality infant-toddler care. Leaders need to advocate for cross-sector partnerships, full-service schools, and early childhood centers. Support services for needy families should continue through the preschool years and elementary grades.

THE BIRTH THROUGH 3RD-GRADE CONTINUUM