Fairfield Board of Education

Mathematics Curriculum Grades 3-5 Questions

1. What are the Common Core State Standards (CCSS)? Are they internationally benchmarked?

The Common Core State Standards (CCSS) Initiative is a state-led effort coordinated by the National Governors Association Center for Best Practices (NGA Center) and the Council of Chief State School Officers (CCSSO). The K-12 Standards clearly communicate what students should know and be able to do at each grade level. They focus on core conceptual understandings and procedural skills and sequence them in a coherent and logical progression to prepare students for career and college readiness.

The CCSS are internationally benchmarked with similar learning expectations of top-performing nations like Singapore, Japan, Germany, Korea, and Finland. A review of the CCSS conducted by Achieve, a bipartisan, nonprofit education reform organization, found that the CCSS are on par with those learning expectations set by Japan and Singapore in terms of rigor, coherence, and focus.

2. Why are we proposing a revision to the mathematics curriculum?

Fairfield elementary students have consistently performed well on the Connecticut Mastery Test in mathematics. Upon careful analysis of these scores we find that students could improve in the areas of estimation, measurement, fractions, and applying their knowledge to problems. This trend is also reflected in the district's benchmarking data (Blue Ribbon). Additionally, data indicate that Fairfield students in kindergarten and first grade perform slightly higher than their peers nationally but grade 2 data identifies a plateau in performance.

The proposed math curriculum also addresses the problem of the current curriculum that is a 'mile-wide and an inch deep' by providing more balance in conceptual understandings and procedural skills. It also provides coherence and equity within and across grade levels in the school district. The newly proposed curriculum, just like high-performing nations, focuses on fewer standards in each grade level with emphasis on developing an understanding of "number" in the elementary grades.

3. What is the difference between curriculum, resources, and instructional model?

	Curriculum	Resources	Instructional Model
Definition	Curriculum outlines the expectations for what students should know and be able to do at each grade level.	Resources are not the curriculum. They are support materials to help teachers deliver the curriculum, i.e. textbooks, trade books, and other materials.	The instructional model is how the curriculum is delivered.
Math Example – Conceptual Knowledge	Standard: Understand properties of multiplication and the relationship between multiplication and division.	Contexts for Learning Mathematics Teacher Resource Guide (Heinemann)	**Fairfield's Balanced Mathematics Instructional Model** – through inquiry, students investigate understandings of numerical concepts
Math Example – Skill Development	Standard: Fluently multiply and divide within 100.	Scott Foresman Textbook	**Fairfield's Balanced Mathematics Instructional Model** – through direct instruction and practice, students master basic mathematical skills

4. What are different mathematical instructional approaches?

There has been debate for many years over teaching methods in mathematics. The two primary views are the "traditional" approach and the "reform" approach. Simplistically, traditionalists come from a belief that children must develop basic math skills through rote memorization, repetition and practice, before they can understand mathematical concepts (Walbert, 2001). Reformists place a greater emphasis on understanding mathematics, and claim that learning happens more quickly and more easily when understanding of mathematical concepts is the focus of instruction. (Sowder, 1998). The balance of these two approaches is represented by many including the work of the Thomas B. Fordham Foundation, a non-profit research organization, which recommends, "develop coherent arithmetic standards that emphasize both conceptual understanding and computational fluency." (Klien, 2005). Fairfield's approach is a balance of both conceptual development and skill and procedural practice. This is consistent with the Common Core State Standards research and is also reflected in the CCSS Mathematical Practice Standards.

5. What is a "spiral" curriculum?

A spiral curriculum covers the same topics several years in a row, advancing them slightly each time. Each time the student is exposed to it, the student learns more about the mathematical topic and has the opportunity to expand his/her knowledge and skill set. The theory here is that once a student has seen a topic he/she is better able to construct his/her own knowledge upon that framework. Fairfield's newly proposed Grades 3-5 mathematics curriculum moves away from the spiral approach and toward fewer standards with greater emphasis on depth of understanding and mastery at each grade level.

6. What are the differences between the current curriculum and the newly proposed curriculum?

The table below provides a sampling of the proposed shifts in curriculum.

Current curriculum	Proposed Curriculum
Grade 3 Count forward and back from any number 1 - 1,000 Count by 2s, 5s, 10s, 50s, 100s	Grade 3 Standards related to counting have been moved to earlier grades and therefore do not appear in this grade level
Grade 3 Demonstrate mastery of basic multiplication/division facts (0-5, 10)	Grade 3 Demonstrate mastery of basic multiplication/division facts (0-10). Determine the unknown number in a multiplication or division equation
Grade 4 Multiply 2-digit multiplication	Grade 4 Multiply whole numbers up to 4-digit by 1-digit and two 2-digit numbers using place value strategies
Grade 4 Solve simple story problems involving addition and subtraction	Grade 4 Solve multi-step word problems with whole numbers using all operations
Grade 5 Maintain fluency of multiplication and division facts	Grade 5 Fluently multiply multi-digit whole numbers using the standard algorithm Divide 4-digit numbers divided by 2-digit numbers
Grade 5 Add and subtract fractions and mixed numbers with like denominators	Grade 5 Add and subtract fractions with unlike denominators Use multiplication and division to multiply and divide fractions.

7. What is Fairfield's Balanced Mathematics Instructional Model?

The Balanced Mathematics Instructional Model represents how teachers deliver the math curriculum in a classroom. It engages students in collaborative and active problem solving involving rich and rigorous tasks to develop conceptual understanding of big mathematical ideas. This is followed by direct instruction with student practice of skills. The instructional model emphasizes differentiated instruction to meet the needs of all students.

8. How did Fairfield develop its instructional model and curriculum?

Fairfield began work on its elementary mathematics program by reviewing the curriculum and instructional model, analyzing student achievement results and assessing available resources and professional development practices. We determined that there were many inconsistencies in curriculum implementation not only across the district but within the same school. We conducted research on instructional models and, with the help of outside consultants, developed an instructional model based on best practices. We developed the Balanced Mathematics Instructional Model in line with Fairfield's current curriculum standards emphasizing a balance of conceptual understanding and procedural skill practice. Teachers worked during the past two summers to revise units of study to reflect the new instructional model.

The curriculum revision process started when Connecticut adopted the CCSS. Schools piloted sample units within the instructional model. Professional development focused on building the capacity of teachers to understand the mathematics content, children's cognitive development and the big ideas and common misconceptions children have in mathematics. We will complete units of study this summer after the curriculum is approved and they will be ready for full rollout in all classes in grades 3-5 across the district in the fall of 2012.

Pre-kindergarten through grade 2 work has begun in the form of professional development. The PK-2 math curriculum will be revised and brought to the Board of Education in the 2012-2013 school year. Some initial units of study based on the instructional model will be piloted next year. We will review resources with the expectation that full implementation of the PK-5 math curriculum will be in place in 2013-2014.

9. Are the basic facts and standard algorithms taught?

Yes. Standard algorithms are one of the many ways we teach children to record their mathematical thinking. It is expected that all 3rd graders know, with automaticity, the basic facts of all four operations (addition, subtraction, multiplication, and division) with whole numbers. The grade 4 expectation is to use their knowledge of basic facts in all four operations to perform multi-digit computation. In grade 5, students are expected to use their understanding of computation with whole numbers and apply it to fractions and decimal numbers.

10. What textbook is Fairfield using?

Fairfield currently uses multiple resources to implement the curriculum, one of which is the Scott Foresman-Addison Wesley textbook. Currently, it is premature to recommend a new resource to support the implementation of the newly proposed Fairfield curriculum as publishers are still working to align their texts with the CCSS. Review of resources is an ongoing process. A review and recommendation will be brought to the Board of Education when new mathematics materials are made available and found to align with our curriculum and instructional needs.