Warren Township Schools

Shining Brighter Every Day

AREA OF FOCUS: Math Tracking

GRADE LEVELS: Grade 5 and Grade 6

COMMITTEE MEMBERS:

Dr. Tami Crader - Superintendent
Bill Kimmick - Curriculum Coordinator
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Robert Comba - Middle School Principal
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Mary Balkonis - ALT Math ASAP Teacher
Nancy Andrews - ALT Grade 5 Math Teacher
Janet Milita - Central Principal
Mary Beth LeBlond - Central Grade 5 Math Teacher
Sheri DeShields - Central Math ASAP Teacher
Jill Zimmer - Central GT Teacher
Scott Cook - Mount Horeb Principal
Michelle Cebula - Mount Horeb Grade 5 Math Teacher
Wendy Piller - Mount Horeb GT Teacher
Amanda Gordon - Mount Horeb Math ASAP Teacher
Jeff Heaney - Woodland Principal
Adam Yenish - Woodland Grade 5 Math Teacher

PROJECT ABSTRACT:

A committee comprised of Grade 5 math teachers, Grade 6 math teachers, K-8 Gifted and Talented Teachers, Math ASAP Teachers, and building and district administrators met multiple times to evaluate grouping practices in Grades 5 and 6 mathematics. The committee's charge was to:

- Evaluate current student grouping practices in Grades 5 and 6 through the lenses of:
    - the Common Core,
    - literature about best practices, and
    - the overall progression of math courses offered in middle school and the high school.
- Make a recommendation to superintendent regarding grouping practices in Grade 5 for the 2015-2016 school year and Grade 6 in the 2016-2017 school year.

The committee limited its focus to Grades 5 and 6 because these are critical transitional and foundational years for students. The charge of the committee was to carefully evaluate whether tracking is appropriate in these two grades only, not to evaluate the overall practice of tracking at the middle school. Grades 7 and 8 math grouping practices were not considered by the committee.

The committee considered the following information:

- position statements from the National Council of Teachers of Mathematics
- New Jersey Common Core State Standards
- literature about the distinction between ability grouping vs. tracking
- longitudinal NJ ASK math growth scores that tracked cohort performance from Grade 3 to Grade 7
- building performance reports
- math grouping practices from districts similar to Warren
- teacher attitudes and feelings about grouping practices and curriculum implementation

During the committee process, the following issues were considered:

- Do grouping practices result in greater achievement for all students?
- Do grouping practices result in a disadvantage to certain groups of students?
- Are tracking practices in Grades 5 and 6 developmentally appropriate?
- What are our current grouping practices in Grades 5 and 6? Do they address student needs? Why? Why not?
- What messages are explicit and implied within grouping practices?

The information that follows provides an overview of the committee's process and recommendation.

STATEMENT OF NEED:

The New Jersey Common Core State Standards in Mathematics were adopted by New Jersey in 2010. In the four years that followed, the Warren Township mathematics curriculum underwent a great deal of revision. During the 2011-2012 school year, curriculum materials were revised and delivery was modified to reflect instructional shifts outlined at each grade level in the state standards. This was a transitional year in which the textbook series that had been used for a number of years were combined with resources and new units specifically developed to address the Common Core standards. During the 2012-2013 school year, new textbook series were adopted to provide teachers and students high quality, Common Core-based resources to address the demands and rigor present in the NJ Common Core math standards.

Since the 2010 adoption of the Mathematics Common Core State Standards, mathematics instruction has been a professional development and curricular focus in the Warren School District. Teachers have continuously revised curriculum, participated in professional development focused on grade level specific standards and practices, and continued to develop their expertise in delivering the mathematics curriculum. Explicit in the Common Core standards is:

- an increased in-depth focus on fewer mathematical topics at each grade level.
- a focus on mathematical rigor
- an emphasis on specific mathematical practices that require students to:
    - Make sense of problems and persevere in solving them.
    - Reason abstractly and quantitatively.
    - Construct viable arguments and critique the reasoning of others.
    - Model with mathematics.
    - Use appropriate tools strategically.
    - Attend to precision.
    - Look for and make use of structure.
    - Look for and express regularity in repeated reasoning.

      (Common Core State Standards: Standards for Mathematical Practice)

The mathematics curriculum shift that the state and the Warren School District experienced has resulted in a continuous need to evaluate instructional practices and resources. In truth, this shift occurred before the introduction of the Common Core State Standards and has accelerated since its introduction. In light of these shifts, tracking in mathematics is an area that should be examined at certain grade levels to ensure that all students are provided appropriate opportunities to develop mathematically.

Committee Summary:

Teachers who served on the committee reported that the focus on mathematical practices is an area that all students find challenging, that the increased rigor and depth of instruction has provided a level of challenge that goes far beyond computational efficiency found within a more traditional program, and that the pacing and delivery of curriculum is similar in the current high and hetero tracks of students. In fact, during the current school year teachers report that because of the needs of students and demands of the curriculum, content coverage and pacing of the "hetero" and "high" classes in many cases are similar. In addition, as the district gets smaller and the number of Grade 5 students at each school decreases, tracking impacts all areas that switch for instruction. Essentially, by tracking math in a building that has two Grade 5 sections, any other content area scheduled to switch is grouped according to the math grouping.

The following are critical points that the committee considered as a result of its literature review:

- There is a distinction between ability grouping and tracking.
    - Ability grouping is flexible and allows teachers to make decisions based on student needs in a particular mathematical strand or unit. Robert Slavin's work during the 1980s refers to this model as a "within class ability grouping." (Slavin 8) Paula Olszewski-Kubilius uses the phrase "flexible ability grouping" to describe the process of addressing varying needs within a class. Tom Loveless, of the Brookings Institution, describes ability grouping as a process in which a single teacher may divide students into small instructional groups reflecting different levels of ability. "Because the groupings are within-class (and often decided by a single teacher), ability grouping is more flexible than tracking. Groups may be reshuffled periodically to reflect changes in student performance." (Loveless 14)
    - Tracking is a permanent placement that is typically established by course. "In tracked academic subjects, students are assigned to different classrooms, receive instruction from different teachers, and study a different curriculum. The names of (high school) courses signal curricular differences." (Loveless 13) Typically, once in tracked classes, students are not ability grouped.
- Supporters of tracking argue that the practice "allows teachers to tailor the pace and content of instruction much better to students' needs and, thus, improve student achievement. For example, teachers can provide needed repetition and reinforcement for low-achieving students and an advanced level of instruction to high achievers." (NEA) Detractors argue that students in lower tracks receive a "lower quality of instruction than other groups. This, they claim, contributes to a widening of the achievement gaps." (NEA)
- The research and professional literature suggests that tracking is beneficial to the gifted mathematics students (traditionally the top 3-5%). (NAGC)
- There are implicit and explicit messages that result from tracking students at a young age. The central argument against tracking "has to do with the fact that this practice must create classes or groups of low achievers. These students are deprived of the example and

stimulation provided by high achievers, and the fact of being labeled and assigned to a low group is held to communicate low expectations for students which may be self-fulfilling." (Slavin 9) The expectations may be the result of difference in perceived expectations, individual and peer attitudes about tracks, and adjustments that are made to the actual curriculum or instructional expectations - either by design or because of expectations.

- Tracking can result in teachers knowingly or unknowingly limiting student access to opportunities to experience challenging mathematical content. (Gamoran)

NJ ASK Review:

Warren traditionally has a high percentage of students in all grades score at the Advanced Proficiency level on the NJ ASK math assessment. In some years, upwards of 60% - 70% of a grade level cohort score at this level of proficiency. As a result, the committee looked beyond the proficiency rates and also focused on the growth scores of individual students within classes.

- Low growth suggested that a student did not make a full year's growth in math.
- Typical growth suggested that a student grew one academic year.
- High growth score suggested that the student progressed more than one year.

In reviewing and evaluating three years of Warren NJ ASK mathematics scale and growth scores of Grades 3, 4, 5, 6 and 7, the following was revealed:

- The growth score movement - how many students stayed the same, moved up one or two growth levels, or moved down one or two growth levels - was similar for both the hetero and high classes.
- Students made similar growth from Grade 3 to 4 (untracked) and from Grades 4 to 5 (tracked). In some years, the untracked years revealed more growth for students as a whole. In other years, tracked students revealed more growth as a whole.
- When comparing high and hetero NJ ASK results, a higher percentage of students in the high classes were considered low growth when compared to the percentage of students who were low growth in the hetero classes.
- No clear conclusion could be drawn regarding whether grouping in Grades 5 and 6 resulted in higher growth scores for high or hetero classes. In some years, students in high classes demonstrated greater growth than hetero students; in other years students in hetero classes demonstrated greater growth than high students.

Middle School Practices:

In reviewing tracking practices of 13 middle schools with similar DFG profiles to Warren, seven of the schools do not track for high or hetero in grade 6. It should be noted that four of the schools that do track (Warren included) are Watchung Hills sending districts. All of the districts surveyed track in Grades 7 and 8. Ten of the 13 districts, Warren included, track for pre-Algebra for their highest ability math students in Grade 6. Schools have varying time allotments for math instruction.

Math Compacting Trends:
Math compacting is an instructional model that is used to assist teachers in differentiating instruction by enabling students to work with the G&T teacher if the student has mastered particular mathematics strategies. This is a strategy developed out of the National Research Center on the Gifted and Talented (Renzulli) and has been in place in Grades 1-5 in the Warren Schools for over 10 years. The determination of mastery is made through a unit pre-assessment administered to the entire class. Students who compact out for one unit, will not necessarily compact out for the next unit. It is consistent with flexible ability grouping models that are supported by literature and is a technique for addressing the needs of students in specific units of instruction.

During the 2012-2013 year, the compacting structure was adjusted to align more carefully with the rigor and demands of the current math curriculum. In evaluating current 2014-2015 compacting numbers, fewer students are compacting out of the daily math instruction in Grades 4 and 5. This data suggests that the rigor of the general math program has increased in recent years and that the students eligible for compacting are likely the 3-5% of students who may have an exceptional mathematical aptitude and are authentically in need of specific enrichment support.

Literature Review:
A review of literature suggests the following areas are critical to high quality mathematics instruction:

- High expectations for all students.
- Instructional practices must be advantageous for all students.
- A growth mindset is critical for all students to succeed. There must be a belief that all students are capable of making mathematical growth.
- Different students emerge as talented in different topics or strands of math.
- Challenging and rigorous tasks should frame mathematical investigations and sustain learning.
- Instruction must focus on problem solving strategies and the mathematical practices, not strictly computation.
- Ability grouping should be flexible and fluid. Decisions should be made using summative and formative assessment information.
- Collaboration between, and professional development of, teachers is critical to a quality program.
- Common Core has resulted in greater rigor and deeper emphasis on fewer topics. There is a more narrow and deeper instructional focus that emphasizes the major work of the grade: Concepts, Skills and Problem Solving.
- Conceptual understanding, fluency and real-world application are critical aspects of effective mathematics instruction.

Results:
The committee could not definitively determine that tracking has resulted in positive gains for students in Grades 5 and 6. Certain academic years may have been influenced by teacher moves, introduction of new programs, or general profiles of cohorts. Studying cohorts over time did reveal that students tended to demonstrate levels of growth regardless of whether they were tracked or not. When comparing untracked years in Grades 3 and 4 and tracked years in Grades 5 and 6, the proficiency and growth ratings did not reveal that grouping dramatically influenced growth or proficiency results. This is consistent with literature review findings in which "over 70 years of intense debate by respected researchers in the field of education has failed to definitively answer the question of whether one model of instruction is preferable over another." (Stroud 92)

The committee did conclude that tracking, among other possibilities, could: limit access to rigorous mathematics for hetero groups, establish a situation in which a student is permanently placed in an inappropriate track at a young age, influence a teacher's decision-making about introduction of certain content, and communicate an inaccurate message about a student's mathematical ability at a very young age.

Teacher expertise and training is a critical aspect of effective math instruction. During recent years, all teaching levels within Warren have had increased opportunities for professional development in the area of mathematics instruction. The National Council of Teachers of Mathematics suggest that mathematics should be delivered by a teacher who has in-depth knowledge of the grade level- specific areas of focus and who has developed instructional skill. The implication is that the teacher's skill in delivering the mathematics curriculum may have greater influence on student success than tracking students in general math classes.

Grouping Options:

The following possibilities are presented as options when considering the issue of Grades 5 and 6 math tracking within the Warren School District:

Option 1:

- Leave current tracking and identification practice in place.
- Maintain practice of having one teacher teach Grade 5 math in each building.
- Expand single math teacher to Grade 4 in 2015/2016.

Benefits	Challenges
● It is a familiar structure. ● It potentially narrows the range of ability within a given class to enable teachers to better address instructional need. ● Allows for development of greater expertise and consistency in Grade 4 while not introducing tracking at this level.	● Assumes that students are equally strong in all strands of math and that groupings have limited heterogeneity. ● Process uses data that is no longer easily available. May require administration of another type of assessment until PARCC data is available. ● As the district becomes smaller, other areas that switch in Grade 5 are overly influenced by the math grouping. ● Eventual possibility of one section in a building.

Option 2:

- Add a GT math class to Grade 5. Identify top (traditionally) 3-5% of math students for replacement GT math track.
- Eliminate high and hetero tracking in Grade 5.
- Maintain practice of having one teacher teach Grade 5 math in each building.
- Expand single math teacher to Grade 4.
- Leave tracking model in Grade 6 for all levels.

Benefits	Challenges
● Literature supports this model for the highest math students. ● Provides greater flexibility for ability grouping rather than tracking all students. ● Maintains high level of professional expertise and instructional consistency in Grade 5. ● Creates a high level of professional expertise and instructional consistency in Grade 4. ● Additional schedule switching - ELA/SS or Science - are not influenced by math grouping in Grade 5.	● Possible added cost of GT math teachers in Grade 5. ● If Reach teacher was used to instruct GT math track, compacting option would be eliminated from Grade 5 and potentially other grades. ● If Reach teacher was used to instruct GT math track, the Reach Too and Reach program for other grades would be impacted. ● Schedule impact in all buildings in order to deliver the program. ● Identifying students for a track of this nature may

	create rigid track that does not allow movement. ● Stakeholder resistance to change.

Option 3:
- Eliminate tracking in Grade 5 in 2015/2016.
- Maintain single math teacher in Grade 5.
- Expand single math teacher to Grade 4 in 2015/2016.
- Maintain compacting model.
- Leave tracking model in Grade 6 for all levels.

Benefits	Challenges
● Literature supports compacting model for the highest math students in grade 5. ● Provides greater flexibility for ability grouping rather than tracking most students in Grade 5. ● Maintains high level of professional expertise and instructional consistency in Grade 5. ● Creates a high level of professional expertise and instructional consistency in Grade 4. ● Additional schedule switching - ELA/SS or Science - are not influenced by math grouping in Grade 5.	● Does not provide increased flexibility to ability group middle school students. ● Stakeholder resistance to change.

Option 4:
- Eliminate tracking in Grade 5 for 2015/2016.
- Maintain single math teacher in Grade 5.
- Expand single math teacher to Grade 4 in 2015/2016.
- Maintain compacting model.
- Leave high/hetero/pre-algebra tracking in Grade 6 for 2015/2016.
- Eliminate high/hetero tracking in Grade 6 in 2016/2017.
    - Maintain one curriculum pacing for Grade 6 based on the current "high" curriculum
    - Maintain pre-Algebra track in Grade 6.

Benefits	Challenges
● Literature supports compacting model to address highest math students in grade 5. ● Eliminates tracking model in Grades 5 and 6 and provides greater flexibility for ability grouping rather than tracking. ● Creates and maintains high level of professional expertise and instructional consistency in Grades 4, 5 and 6. ● Additional schedule switching in Grade 5 - ELA/SS or Science - are not influenced by math grouping. ● Middle school maintains tracks in Grades 7 and 8 and provides same level of access to Algebra and	● Stakeholder resistance to change.

Geometry courses that is currently provided. ● Transitions from tracking model in Grades 5 and 6 over a two year period.	

PROGRAM RECOMMENDATION:

The recommendation of the committee is the following option:

Option 4:

- Eliminate tracking in Grade 5 in 2015/2016.
- Maintain single math teacher in Grade 5.
- Expand single math teacher to Grade 4 in 2015/2016
- Maintain compacting model.
- Leave high/hetero tracking in Grade 6 for 2015/2016.
- Eliminate high/hetero tracking in Grade 6 for 2016/2017.
    - Maintain one curriculum pacing for Grade 6 based on the current "high" curriculum
    - Maintain Pre-Algebra track in Grade 6.

Benefits	Challenges
● Literature supports compacting model to address highest math students in grade 5. ● Eliminates tracking model in Grades 5 and 6 and provides greater flexibility for ability grouping rather than tracking. ● Creates and maintains high level of professional expertise and instructional consistency in Grades 4, 5 and 6. ● Additional schedule switching in Grade 5 - ELA/SS or Science - are not influenced by math grouping. ● Middle school maintains tracks in Grades 7 and 8 and provides same level of access to Algebra and Geometry courses that is currently provided. ● Transitions from tracking model in Grades 5 and 6 over a two year period.	● Stakeholder resistance to change.

Discussion:

In a review of the literature about tracking and ability grouping, the committee found that tracking does make sense for the highest achieving math students. These are students who are likely to complete Geometry by the end of 8th grade, will benefit from an in-depth and accelerated program, and are essentially considered gifted and talented math students. As such, this is a small percentage of the student population, traditionally 3%-5%. Different studies also suggest that if tracking takes place, it should provide options for students to move between tracks if necessary. Within the current system of tracking in Warren Grades 5 and 6, the expected year

of movement between tracks is in the transition from Grade 5 to 6. After this point, movement between tracks is not the norm.

In reviewing NJ ASK results, there is no clear indication that tracking has positive results for all students. Almost 30 years ago, Robert Slavin argued for heterogeneous classroom arrangements by stating that "any ability grouping plan must have clear educational benefits if it is to be justified. Because no achievement benefit of (tracked) class assignments have been identified, and because more effective grouping methods exist, use of the strategy should be avoided." (Slavin71) In reviewing Warren NJ ASK scores, advanced proficient students tended to remain advanced proficient from one year to the next. However, their growth scores did not necessarily advance in years that they participated in tracked classes. Hetero students tended to demonstrate a similar rate of growth as high students - both in tracked grades and non-tracked grades. In Warren, a review of NJ ASK data does not substantiate that grouping, except for the highest students, results in clear benefits.

The literature also suggests that the decision-making process that teachers employ and the professional development in which teachers participate is critical to effective instruction. Studies indicate that students of all levels can benefit from heterogeneously grouped classes that employ an emphasis on high standards for all students and a more flexible ability grouping model. What is most important in this arrangement is that teachers have an in-depth understanding of content and strategies that enable the flexible ability grouping to be successful and a willingness to continuously assess students, using formative and summative assessment techniques, and adjust instruction to address student needs In order to be effective, "this requires that teachers are able to add advanced content and adjust pacing for students who are ready to move ahead. It's important to emphasize that, without modified instruction, the learning gains that are possible will fail to materialize." (Kubulius)

In recent years, the district has committed resources to professional development in the area of math instruction. Teachers in the upper grades have attended out-of-district PD sessions and consultants have been brought into the district to meet with lower grade teachers. Grade 5 and Grade 6 teachers feel positive about a move away from tracking to a flexible grouping structure. Targeted professional development opportunities would continue as well as an emphasis on teacher collaboration about best practices and strategies. Perhaps most importantly, the Grade 6 curriculum for high and hetero students, which currently uses the same resource (Big Ideas), would be merged and all students would be expected to achieve the pacing that is currently considered pacing for the "high" class. Within the Common Core documents, it states that the mathematics "K-7 CCSS effectively prepares students for algebra in 8th grade." (Appendix A 81) In addition, the literature cautions against accelerating students too quickly into high school mathematics courses: "rather than skipping or rushing through content, students should have appropriate progressions of foundational content to maximize their likelihoods of success in high school mathematics." (Appendix A 80) The committee's recommendation delays tracking until Grade 7 in order to provide students and staff the flexibility of an ability grouping model. In

doing so, the eventual provision of tracking takes place when students are better prepared for and closer to the transition to a formally tracked Algebra course.

STAFFING:
Recommendation does not require additional staffing.

PROGRAM COMPONENTS:
There are no additional program components.

PROFESSIONAL DEVELOPMENT:
In continuing to focus on professional development in the area of mathematics, resources can be focused on developing expertise for identified teachers to develop their content fluency and extend their ability to effectively differentiate mathematics instruction. Grades 4 and 5 math currently requires an in-depth understanding of specific content and strategies to effectively deliver high quality instruction. In having one teacher on each building team in Grade 4 and one teacher in Grade 5 responsible for math instruction, students will be provided a greater degree of consistency in curriculum delivery. It is recommended that this shift occur in Grade 4, regardless of tracking. Targeting specific teachers to deliver math instruction also promotes a district support system and collaborative structure focused on math instruction. (Note: It is not felt to be developmentally appropriate for students below Grade 4 to switch teachers for instruction in this manner.)

PROJECTED COSTS: There are no additional costs.

Sources:

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Access and Equity in Mathematics

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