

# M.S.A.D. No. 75 - Mathematics Review 2018-2019

## Introduction and Context

M.S.A.D. No. 75 sets goals every two years to focus the efforts of all educators in the District on various improvements to student learning, as mandated by the District's mission statement. Building principals set specific school goals related to these district goals, and lead the staff at each school in activities that promote the achievement of these goals. Our current 2018-2020 Board Goals for achievement state:

## Goal 1: Maximize Growth and Achievement for All Students

- A. Mt. Ararat High School will maintain a 4 year graduation rate above the state average.
- B. The percentage of students in grades 3-8 and the third year in high school who meet state expectations on the Maine Educational Assessment (MEA) will be equal to or greater than the statewide percentage of students (in both English Language Arts and mathematics).
- C. 70% of students will demonstrate expected fall to spring growth, as measured by universal screening tools in English Language Arts and Mathematics.

As we look back to 2014-15, the District had just begun revising the standards as a result of the Common Core State Standards (CCSS) for Mathematics being included in the Maine Learning Results. With the change in standards, came the need for changes in programming, assessment, reporting and even teaching practices as more information became available as to how to effectively teach to these rigorous Mathematics standards. This report reflects on the changes we have put in place highlighting the positives, identifying the challenges that still exist, and providing some recommendations for moving forward so that we can continue to maximize growth and achievement for all.

### **Vertical alignment**

A team of district math teachers developed a progression of learning that outlined learning outcomes at each grade level, K-12. These progressions were developed to articulate the vertical alignment of grade level/course expectations and to clarify the prior learning necessary to progress to the next learning goal. This work was part of the state initiative to have clear standards for graduation.

At the elementary level, lead math teachers took the district-level progressions and further developed those progressions into teacher-friendly and student-friendly language which align with our tracking system, Empower. With the use of the district tracking system, it is now more possible to identify holes in previous year's learning. It is evident that there are learning goals that are not met and sometimes not even taught. It is a challenge to give all students access to all the learning goals while supporting learners who struggle to meet learning goals.

The Middle School has begun to use Open Up Resources which is aligned to 6th, 7th, and 8th grade instruction with the Common Core State Standards for Mathematics. We have not explored the vertical alignment with the elementary or high school since implementing this program.

In all high school mathematics courses, mathematics teachers have designated specific progressions of learning goals in each of the 5 mathematics graduation standards to identify course expectations throughout the progression. The learning goals in these five standards not only indicate the goals that must be met for a Mt. Ararat High School diploma, but also those that are addressed in our curriculum that go beyond diploma requirements.

### **Existing Mathematics Programming**

EnVisionmath2.0 was adopted as the core elementary mathematics program four years ago. Across the district, all elementary schools use this program. Teachers across the district had the chance to respond to a survey and to participate in grade level group discussions to collect feedback on our current programming. The following criteria set the parameters for collecting feedback on the EnVisionmath2.0 program:

- Alignment to learning goals
- Instructional methods
- Student/Teacher/Parent Materials

The following is a summary of those categories.

## Alignment to Learning Goals:

In general, teachers agree that the program provides rigorous learning goals and that there are daily "I Can" statements for each lesson. That said, the "I Can" statements are sometimes difficult to connect to the bigger picture and need to be reworked to align with learning goals. The program's scope and sequence of learning goals is not very clear, and therefore a district progression was created to bridge the program to the learning goals. In addition, the program's assessments do not accurately measure the expected learning goals, and teachers often need to rely on teacher-created assessments to gather evidence of learning.

# Instructional Methods:

Across the grade levels, there is concern with the development of procedural fluency. Many teachers reported that the program jumped from concrete to visual to abstract too quickly, not allowing for connections to be made and understanding to be solidified before moving onto another strategy. Though there are many examples for students to practice, often those examples do not promote conceptual understanding. Often, the lesson videos are not used by teachers. Some teachers report not using the videos because students need more hands-on experiences. Teachers in the upper grades report that the videos are not engaging for their students.

## Materials:

Teachers reported that it is difficult to navigate the program's online component. A little over half the teachers reported using the online components with students, mainly for assessing. Many teachers reported that they do not send home the parent letter, some because they can not find it online. Teachers reported needing more staff development to know how to effectively plan, instruct, and assess with the current resources. Across the grades, teachers reported that the program is very language heavy and that there is little space for students to show their work. In the lower grades, many do not send home the homework because the language is too confusing. Parents do not access the online supports for homework.

At the end of last year (2018), the Middle School adopted *Illustrative Mathematics - Open Up Resources* as the core program.

## Some Quotes from Teachers

I absolutely love the Open Up Resources program as a teacher. I find it to embed problem solving, hands on activities, and independent practice in one program. I have

seen more students engaged and talking about math which is a huge shift. The students are not afraid to make mistakes and learn from each other. The "cool downs" which are check ins help me form my instruction for the next day based on what they students need to move their learning forward.

It has presented a pretty comprehensive learning structure with clear learning targets that scaffold concepts together. This has equipped my kids with the tools to discover some wonderful symmetries in the world.

Due to the range of courses at the High School, resources are selected based on the nature of each course and the various goals of the students.

| Core Mathematics Programs/ Resources   | School(s)  |
|--|--|
| enVisionmath2.0, 2014  | Bowdoin Central School<br>Bowdoinham Community School<br>Harpswell Community School<br>Williams-Cone School<br>Woodside School |
| Illustrative Mathematics - Open Up Resources (6,7,8)   | Mt. Ararat Middle School   |
| Glencoe: Algebra I, Geometry   |  |
| Glencoe: Algebra I, Geometry, Algebra II,<br>Advanced Mathematics  | Mt. Ararat High School   |
| Algebra and Trigonometry (Foerster)<br>Precalculus with Limits (Larson)<br>Calculus of a Single Variable (Larson, Hostetler,<br>Edwards) |  |
| The Practice of Statistics (Yates, Moore, McCabe)  |  |
| Fundamentals of Java: AP* Computer Science<br>Essentials (Lambert, Osborne)  |  |

The following chart shows core programs available in the district.

## **Special Education**

At the elementary level, many special education students receive math instruction through the core program *enVisionmath2.0* at a lower grade level. Many special education teachers supplement the program with a mix of extra practice and supplementary programs and websites such as: Splashmath, Teachertube, On Cloud Nine (K-2 early intervention), <u>Math4SpecialNeeds.com</u>, <u>https://www.xtramath.org/</u>, and John Van De Walle's book, *Elementary and Middle School Mathematics, Teaching Developmentally.* For our intellectually disabled students and children with autism, teachers are using the AbleNet program a multi-sensory program that builds conceptual understanding. Based on the data collected across the district, there is inconsistency with the resources being used to serve our tier 2 and tier 3 students.

At the Middle School, many special education students have a blend of teacher-created and/or modified curricula from Open Up Resources supported by websites such as http://khanacademy.com and http://IXL.com. A variety of published and locally-developed resources are used to help students reach grade level benchmarks. We do not have a modified learning progression and it is difficult for our special educators to determine where to focus the learning. Nor do we have a specific Tier 2 or 3 program to address needs when the core program is not sufficient.

At the high school, various self-contained Special Education math classes are offered with a modified curriculum, resources, and expectations to accommodate the students in these groups. The courses are generally aligned with the mainstream Algebra I and Geometry courses, but often use different resources and assessments.

## Title IA

Currently, interventions funded by Title IA are implemented at some elementary schools (BCS, BHM, HCS and WES). Williams-Cone, Mt. Ararat Middle School and Mt. Ararat High School do not qualify for Title IA. Though services vary by school and grade level, teachers funded by Title IA provide supplemental support using EMDI (Elementary Mathematics Diagnostic and Intervention) strategies. Services are given through small group instruction or with an extended-day "Math Club".

### **Response to Intervention (RTI)**

At the elementary level, Response to Intervention specialists primarily focus on literacy. If mathematics support is available, it varies by school and grade level. The RTI learning strategists work in the classroom or pull out small groups of students.

There is one Rtl Math Teacher in the Middle School who is responsible for organizing data to manage Target Time as well as instruct groups during that time. Target Time is a 40-minute block of time four days a week, providing direct instruction to students. The

data used to determine need is from teacher observations, classroom performance, formative assessments and our universal screening tool, STAR. Target Time reaches students who may need to learn prerequisite math skills or to go beyond the current grade-level learning. Not all students have access to target time due to band, chorus and literacy needs.

Also, at the middle school regular education students who are significantly below grade level, are provided interventions such as limited class size and team-teaching approaches.

There is one RTI position at the High School. The goal of the RTI support math program is to promote competency in mathematical skills and problem solving and promote a culture of student success by building confidence and positive relationships with students. All students have access to every math teacher during Academic Support Time. Students can choose to access this support voluntarily, or they can be assigned to it by a teacher. There are weekly after-school study sessions that provide additional support in Algebra I and Geometry, as well as non-structured extra help offered by individual teachers during study halls and after school. The High School also offers Algebra I classes associated with the Freshmen Transition Team Model, each with a reduced class size and student access to a Transition Support Study Hall.

## **Gifted and Talented**

At the elementary level, students identified in grades 3-5 participate in activities to enrich their learning in mathematics. The Gifted and Talented teacher reported the need for establishing a more systematic plan for supporting students who meet learning goals and are ready for more of a challenge.

The Middle School offers Advanced Math courses at each grade level to provide opportunities for students to accelerate their learning. There is a GT target time set up for identified students to receive additional mathematics extensions.

The High School offers advanced level classes and four Advanced Placement math courses to provide more challenging coursework to all students, including those who are identified as Gifted and Talented in mathematics. The High School also offers an after school Math Team program to provide an extra opportunity for students to access challenging math content.

### Assessment

At the elementary level aimswebPlus is the universal screening tool. The data helps to inform needs for Tier 2 and Tier 3 intervention. Many teachers (68%) reported using this data to plan instruction. Teachers reported using other tools to measure student understanding such as:

- Unit Assessments (89%)
- Observation (96%)
- Conversations with students (96%)
- Teacher-made Quizzes (50%)

A significant challenge with the elementary EnvisionMath2.0 program is the assessment component: The assessments do not align to the learning goals. Many teachers recreate or edit the unit assessment to match more closely with the learning goals and scales. It is a challenge to ensure that the custom assessments measure proficiency at the same level of rigor across the district. There is a need to develop district assessments that will provide one common measure when tracking student progress.

At the middle school, teachers use a majority of assessments that come from the Open Up Resources Materials. These assessments include, pre and post and some mid unit assessments to determine students success with the learning goals. The program also has daily formative assessments built into the lessons. Some teachers create their own formative assessments depending on the need of their students.

STAR is the universal screening tool given to students at least 3 times a year. Teachers work with the RTI Math Teacher to use data from STAR math to determine the students' gaps or misunderstanding with skills, as well as measure growth.

At the High School the STAR assessment is given to all freshmen at the beginning and at the end of their ninth grade year. The PSATs are also given to 10th and 11th grade students in October. The Maine High School Assessment (SAT) is given to every 3rd year high school student in the spring. The Accuplacer college placement exam is administered to some college-intending seniors and the ASVAB is administered to students planning to enter the military. There are various teacher-designed formative and summative assessments, common for all students in a particular course.

### **Time for Mathematics in Schedules**

In recent years the time for elementary math has diminished. In practice, most elementary teachers reported teaching math for 45 - 60 minutes each day, though some teachers report teaching math only four days per week, significantly decreasing access to a full year of math instruction. The weekly range is 180 to 300 minutes of math instruction depending on the school and the grade level.

At the Middle School, sixth grade has 240 minutes per week of math class time. Seventh and eighth grades have 245 minutes per week. The High School has scheduled 400 instructional minutes every two weeks for each math course, or an average of 200 minutes per week.

## **Professional Development**

Professional development in mathematics varies across the elementary schools. The focus and monies have been directed mostly for literacy; thus math professional development has been limited to a few one-hour sessions on Wednesday mornings primarily to review learning goals and create scales. This year, because math is seen as an area of need, Wednesday mornings professional development time has increased. Also, classroom teachers attended one day of professional development with a focus on effective teaching practices. When surveyed, elementary teachers reported that Professional Learning Groups (PLGs) generally are not being used for mathematics. Some teachers report taking online courses and webinars to further their instructional practice for teaching mathematics. Many teachers and building principals reported the need for a math coach in their schools.

The Middle School Math Teachers have been actively seeking and participating in PD. As a mathematics department they participated in a book study: *5 Practices for Orchestrating Productive Mathematics Discussions* during their Focus Group Time, and are currently focused on Formative Assessment for this year. The Middle School Math Teachers also attended a training in August 2018 presented by Illustrative Mathematics focusing on the 5 Practices Standards and the structure of Open Up Resource materials. They are looking forward to more PD in the future. We also have some teachers participating in Math4ME to develop skills to work with students performing below grade level.

At the High School level, self-directed learning opportunities are scheduled during one late-start Wednesday, usually monthly. Some high school teachers have availed themselves of additional professional development outside of contracted time by attending regional High School Mathematics Collaboratives four times a year, STEM-focused Summer Conferences and Fall Summits offered yearly by the University of Maine RiSE Center, and various other individual workshops and conferences.

## **Technology Integration With Mathematics**

The enVisionmath2.0 program has an online component, and teachers in grades 3-5 report using some of the features such as the Quick-Check assessments and the videos for students to go back and review. Few teachers report using the games because of

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lack of student engagement and because they are not properly aligned to the standards. Some teachers report using additional websites for practice of skills. Some grade 1 and 2 teachers are using tablets in the classroom. Students use apps such as Number Frames and Geoboards to develop models to show their thinking. Some teachers report using SeeSaw to create digital portfolios of their students' mathematical learning. This tool captures students' thinking as they record and draw their explanations. Parents can access this app to watch their child "doing math", giving parents a better sense of how their child is learning math in school. The use of tablets is not district-wide, due to shortage of devices and limited support for staff development. The technology plan has a vision to increase access each year, though budgeting for staff and devices is a continued challenge.

The Middle School's OUR program has technology components built into the lessons pulling from Khan Academy, Desmos and Geogebra to name a few. Teachers also use IXL and Reflex Math for practicing skills that have been taught. Also, the District's Google Platform provides the ability to to share digital and other teacher-created resources with colleagues and students.

The High School uses web-based sites to support instruction such as Khan Academy, Glencoe, and CollegeBoard.org. Teachers use interactive tools and games such as Kahoot, Desmos, Grapher, graphing calculators, 3-D printers to enhance instruction. Teacher websites offer varying degrees of communication, content, and activities. For instance, some teachers offer teacher-made videos as extra resources for students on a daily basis.

## **Reporting To Parents and Supporting Parents With Mathematics**

At the elementary level there are a variety of ways teachers communicate with parents including: family letters from the enVisionmath2.0 program, Title IA Math Nights, teacher-made newsletters, emails, conferences and report cards.

The Middle School sends out progress reports and report cards as well as holding parent teacher conferences twice a year. Parents are supported with access to the Empower Parent Portal. Parents are encouraged to access class websites to learn about homework updates and resource links. Parents are contacted through individual and group emails as well. The Family Link on Open Up Resources provides parents with additional resources to support their child's learning.

At the High School, parents have access to the Infinite Campus Parent Portal which reports out progress on individual learning goals. Parents and students also have access to the online Program of Studies and to teacher websites that provide in depth information about the learning goals associated with each course. The High School also sends out progress reports and report cards and hosts parent-teacher conferences during the second quarter and on an as-needed basis after that. Many teachers, parents, and students utilize email for student-specific communications.

### Extensions

At the elementary schools there is no formal system for math extensions. The program offers suggested activities, but most teachers report that they create their own materials for any extensions. The Gifted and Talented program offers support for students identified beginning in grade 3. Teachers may recommend other students to join GT math sessions as needed even if not identified.

The Middle School has Advanced Math Classes for 6th, 7th, & 8th grade students with eligibility being based on multiple data points including MEA results, STAR scores, and teacher recommendation. At the 8th grade level, an Algebra 1 class is available; students are assessed at the end of the 7th grade year for entrance into the Algebra classes. In general, teachers utilize the Are You Ready For More Questions from Open Up Resources as well as Khan Academy, IXL, and Math Forum problems of the week to help students extend their learning.

The High School has advanced levels of Geometry, Algebra II, and Precalculus available to students, as well as the junior/senior year options of AP Calculus AB, AP Calculus BC, Calculus (USM concurrent enrollment available), AP Statistics and AP Computer Science. Online and distance learning options are also available for students.

### Integration with Region Ten Technical High School

Currently, approximately 90 of the 737 Mt. Ararat High School students are enrolled in one of the Region Ten Technical High School programs. The students who participate in three years of a vocational program may choose to reduce the number of math, social studies, and science credits required for graduation from three to two credits for two of these three subject areas. Students who participate in a vocational program for four years are only required to complete two credits each in mathematics, social studies, and science.

## Data Review

Based on a review of our MEA scores over the past three years, our students' performance is relatively consistent. For grades 3-8 combined, we typically have approximately 40% of students scoring proficient or above. Our data shows students losing ground in grades 4-6 and then in 7th grade there is a bump back up to scores similar to those seen in grade 4. When compared to students across the State, our students are performing just slightly higher.

In the last three years, between 10%-14% of students with IEPs have been meeting MEA state standards. These students fall farther behind their peers as they progress through grade levels.

When looking at the performance of students who are identified as economically disadvantaged, the results are somewhat consistent. Approximately 25% to 31% were proficient over the past three years, whereas students who are not economically disadvantaged fell between 50% to 59% being proficient.

|  | 2015-2016       | 2016-2017       | 2017-2018       |
|--|-----------------|-----------------|-----------------|
| State: Overall<br>(grades 3-8)             | 39%             | 39%             | 37%             |
| District: Overall<br>(grades 3-8)          | 42%             | 41%             | 41%             |
| Cohort A                                   | 63% (3rd grade) | 45% (4th grade) | 37% (5th grade) |
| Cohort B                                   | 54% (4th grade) | 40% (5th grade) | 31% (6th grade) |
| Cohort C                                   | 32% (5th grade) | 25% (6th grade) | 35% (7th grade) |
| Cohort D                                   | 29% (6th grade) | 45% (7th grade) | 47% (8th grade) |
| Students with<br>Disabilities<br>(overall) | 14%             | 10%             | 11%             |
| Economically<br>Disadvantaged<br>(overall) | 31%             | 26%             | 25%             |

The percentage of students who scored proficient or above on the MEAs were as follows:

Based on a review of our Maine High School Assessment (SAT) scores over the past three years, our students' performance is relatively consistent. We typically have approximately 41% of students scoring proficient or above. When compared to students across the State, our students typically perform better.

In the last three years, approximately 5% of students with IEPs have been meeting standards.

When looking at the performance of students who are identified as economically disadvantaged, the results show a range of 20% to 35% meeting the standards.

|                            | 2015-2016 | 2016-2017 | 2017-2018 |
|----------------------------|-----------|-----------|-----------|
| Third Year High School     | 42%       | 45%       | 36%       |
| Students with Disabilities | 5%        | 12%       | 3%        |
| Economically Disadvantaged | 22%       | 35%       | 20%       |

The percentage of students who scored proficient or above on the SATs were as follows:

# Findings and Proposals

In addition to the collection of information and data for the context of our programming, teachers of mathematics across the district were given an opportunity to either respond to a survey or participate in focus group discussions. Collectively, this information has led to a number of findings which identify gaps between where we currently are and where we need to be in order to ensure that our students can meet college and career readiness expectations in mathematics.

# **Mathematics Programming**

*Findings:* The elementary schools are using enVisionmath2.0 which was selected when programs were made available for the new math standards. There are mixed feelings about whether it is meeting our needs. It will be helpful with the math teacher leaders to help teachers work effectively with the program and to help determine what program is best moving forward. The Middle School is having success with its new program and the elementary level is interested in exploring the same program when it becomes

available in 2020.

Proposal:

- Develop K-5 Common assessments to better align with the learning goals.
- Begin an elementary program review based on effective teaching practices and the state standards.
- Implement the use of math coaches to increase teacher effectiveness and student performance.

# K-12 Vertical Alignment

# Findings:

Over the past several years there has been more district focus on vertical alignment of mathematics programming. In the three years prior to this review there have been some secondary district-wide mathematics meetings focused on curriculum, instruction, and assessment. Both secondary and elementary would benefit from more district-wide collaboration. The elimination of the K-5 Math Specialist position in 2011 continues to contribute to decreased communication between the levels.

# Proposal:

- Annually plan, execute and evaluate goals and expectations for mathematics programming as it relates to the Board goals under the supervision of the Assistant Superintendent.
- Increase communication about transition from 5th Grade to Middle School
- Increase communication about transition from 8th Grade to High School
- Use a common universal screening tool to create a transparent picture of student achievement district-wide.

# Staff Development

# Findings:

From the elementary survey, discussions with building principals and reviewing the data, there is a need to increase staff development for teachers. There has not been a consistent plan for supporting new teachers to our district nor growing our veteran teachers.

At the middle school level, teachers are in their first full year of the Open Up Resources program implementation. The teachers report that the training has been a critical piece to the success of the program.

Proposal:

- *Hire 2.5 elementary math coaches to increase effective teaching practices consistently across the five elementary schools.*
- Maintain professional learning opportunities throughout the school year (e.g., late starts, professional development days, release days)
- Create learning opportunities to develop and utilize common assessments at the elementary level.
- Continue working with Open Up Resources for Middle School onsite and offsite training.

# **Response to Intervention**

# Findings:

While we have observed that students who are partially proficient do not have a sufficient rate of improvement, and may even fall further behind their peers, we do not have a district wide comprehensive system of interventions in place to address their needs. The middle school and high school are seeing growth through their RTI programs. However, a survey of our elementary school revealed that there are a variety of interventions being implemented with no consistency across the elementary schools. Currently, there is no process for choosing research-based intervention systems. Finally, it was found that there is very little time for RTI support at the elementary level.

Based on our elementary staff training and preparation, there is a concern with our current capacity to implement effective interventions.

In elementary focus group discussions, teachers noted a need for better assessments to determine students' needs and strengths.

# Proposal:

- Improve our system of interventions by
  - Investigating research-based intervention programs that address the needs of students at all levels of need
  - Coordinating intervention strategies within each building, and across the district
  - Investigating assessment options for progress monitoring

## **Review Committee Membership**

Elementary: Michael Wilbur, grade 2 teacher; Elin Goodwin, grade 3-4 teacher; Vicky Dow, grade 3-5 teacher; Jessica Theberge, grade 5 teacher; Bridgette Ortiz, Special Education, Kate Greeley, Technology Integrator; Anita Hopkins, principal Middle School: Melissa Cribby, Math Teacher Leader High School: Lisa Walker, Mathematics Department Head; Carmen Palmer, mathematics teacher District-wide: Peg Armstrong, Assistant Superintendent

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#### MEAs Grades 3-8 Special Education Comparison: MSAD 75 to State 2017-2018

### MEAs Grades 3-8 Special Education Comparison: MSAD 75 to State 2016-2017



### MEAs Grades 3-8 Special Education Comparison: MSAD 75 to State 2015-2016





#### MEAs Grades 3-8 Economically Disadvantaged Comparison: MSAD 75 to State 2017-2018

### MEAs Grades 3-8 Economically Disadvantaged Comparison: MSAD 75 to State 2016-2017



#### MEAs Grades 3-8 Economically Disadvantaged Comparison: MSAD 75 to State 2015-2016





#### MEAs Grades 3-8 All Students Comparison: MSAD 75 to State 2017-2018

#### MEAs Grades 3-8 All Students Comparison: MSAD 75 to State 2016-2017



#### MEAs Grades 3-8 All Students Comparison: MSAD 75 to State 2015-2016





#### SATs Special Education Comparison: MSAD 75 to State 2017-2018

## SATs Special Education Comparison: MSAD 75 to State 2016-2017



### SATs Special Education Comparison: MSAD 75 to State 2015-2016





#### SATs Economically Disadvantaged Comparison: MSAD 75 to State 2017-2018

### SATs Economically Disadvantaged Comparison: MSAD 75 to State 2016-2017



#### SATs Economically Disadvantaged Comparison: MSAD 75 to State 2015-2016

| SAT Results (Mathematics)     |                        | Show Schools          | Compare Subgro | <u>sups</u>  |   |
|-------------------------------|------------------------|-----------------------|----------------|--------------|---|
| Mathematics                   |                        |                       |                |              |   |
| 15-16 RSU 75/MSAD 75 (984) -  | 33%                    | 47%                   |                | 16% 4%       | , |
| 15-16 State (ALL) -           | 40%                    | 41%                   |                | 17% 29       | % |
| Well Below State Expectations | Below State Expectatio | At State Expectations | Above State    | Expectations |   |

### SATs All Students Comparison: MSAD 75 to State 2017-2018



### SATs All Students Comparison: MSAD 75 to State 2016-2017



#### SATs All Students Comparison: MSAD 75 to State 2015-2016

