

Winchendon Public Schools

Math Blueprint



Completed - Summer 2022

Preface

In Spring 2022, the Winchendon Public Schools' Math Curriculum Council, which includes faculty and administrators from all grade spans/buildings, drafted the following Math Vision Statement for our district.

The WPS envisions every student will be a creative problem solver who becomes empowered to think quantitatively as they progress through the Massachusetts Mathematics Curriculum Frameworks. We are committed to actively engaging students, stimulating curiosity and inquiry, and building deep understanding and mathematical confidence. We recognize the need to support student growth through the Standards of Mathematical Practice and to move beyond the memorization of procedural components with instructional practices that emphasize explanation, justification, and number sense.

We will consistently and expertly:

- *Maintain high expectations*
- *Foster student engagement through a growth mindset*
- *Assign meaningful, stimulating, rich tasks*
- *Differentiate instruction through small groups, centers, and tiered tasks*
- *Elicit and celebrate different approaches to problem-solving*
- *Promote discourse to encourage discovery and convey understanding*

The Winchendon Public Schools have adopted Illustrative Math (IM) as the curriculum product to realize this vision. IM has been extensively reviewed by EdReports and earns a “green” Meets Expectations rating at all grade levels. The IM program is classified by the Massachusetts Department of Elementary and Secondary Education as High-Quality Instructional Material (HQIM).

We are committed to using the IM program to strengthen Winchendon students' mathematics learning and achievement. The program supports us in strengthening math achievement by:

- Promoting students' belief that “anyone can do the math, and that persevering at mathematics will result in understanding and success.”
- Developing the “habitual inclination to see mathematics as sensible, useful and worthwhile.” *National Research Council (2001). Adding it up: Helping children learn mathematics*
- Giving students a meaningful opportunity to understand the *why* behind the *how* in mathematics and to apply mathematical concepts to new or real-world contexts.
- Developing students' procedural fluency
- Ensuring students do not just learn *about* mathematics, but *do* mathematics, which can be defined as engaging in the Mathematical Practices:
 - Making sense of problems
 - Reasoning abstractly and quantitatively
 - Making arguments and critiquing the reasoning of others
 - Modeling with mathematics
 - Making appropriate use of tools
 - Attending to precision in their use of language
 - Looking for and making use of structure
 - Expressing regularity in repeated reasoning

IM is the Tier 1 Instructional tool for all K-8 math classrooms and High School Algebra 1, Geometry, and Algebra 2 courses. Each school has adopted a platform to deliver the IM curriculum (see below).

- Memorial Elementary: Imagine Learning Illustrative Mathematics
- Toy Town Elementary: Imagine Learning Illustrative Mathematics
- Murdock Middle School: McGraw Hill illustrative Mathematics 6–8
- Murdock High School: McGraw Hill illustrative Mathematics 9-12

Each school will use an adaptive digital learning platform to support students to strengthen conceptual understanding and to support tier 2 instruction by closing knowledge gaps.

- Grades K-5 will use the Renaissance Freckle platform
- Grades 6-12 will use McGraw Hill's ALEKS platform

In addition to IM, VMath will support students in grades 3-8 as a tier 2 tool. It addresses the needs of specific students who require additional support/instruction to comprehend the 2017 Massachusetts Curriculum Frameworks addressed by each module of the IM curriculum.

Students receiving Vmath as a Tier 2 intervention will be determined by:

- Entrance and exit tickets
- Star Renaissance Math Screener
- Teacher Observation

Students in Tier 3 who have significant learning gaps will receive VMath instruction from a special education teacher. VMath will continue to support the learning of state standards using a systematic approach that involves a hands-on and online component.

Curriculum Map

To provide consistent instruction across grade levels, WPS has developed curriculum maps to ensure the consistent implementation of key elements of the IM program across classrooms at each grade level. Maps provide teachers with the pacing and key elements of IM. They include time to administer district and IM assessments and extend through No New Content Days (NNCDs*). Every teacher is provided with the curriculum map before the start of each school year to ensure they are up-to-date:

- The pacing of units: including assessment time and NNCDs*
- MA Curriculum Standards addressed in each unit of study
- Short unit description
- Key unit Vocabulary
- Other unit resources
- District Math Assessment Calendar

* NNCDs are days provided in the pacing of the curriculum map where no new lessons are taught. During NNCD, teachers may use the day to provide additional center time and/or reteach unit skills. Each unit provides at least one NNCD for teachers to use when they need it during the unit based on teacher observation and assessment data.

Assessment System

To inform instruction, create tiered instruction, and ensure student progression through the Massachusetts Curriculum Frameworks grade levels. The assessments we will utilize to monitor student growth and development over time have been incorporated into our district's curriculum

maps considering the time needed to administer the assessments. Below you will find assessment details.

Renaissance Star Assessment:

The Renaissance Star Assessment is a K-12 formative assessment system that will be administered to students three times a year to monitor the progress and growth of each individual student throughout the academic year. The assessment will be administered in fall, winter, and spring to collect data to inform classroom instruction.

Standards-Based Assessments:

The Standards-Based Assessment (SBA) is a formative assessment that will be used to progress monitor student growth and development in the four critical areas of each grade level as defined by the Department of Elementary and Secondary Education (DESE). These assessments will be administered by grade level in November, February, and April using the Renaissance Freckle or Aleks learning tool.

IM Curriculum Assessments:

In addition to Renaissance-based assessments, IM provides various assessment opportunities for each unit. Students will complete these assessments as they progress through the units and acquire new learnings. Below you will find the IM assessments used throughout the year.

Formative Assessment Opportunities:

- **Cool Downs:** Each lesson, starting in grade 2, includes a cool-down (analogous to an exit slip or exit ticket) to assess whether students understood each lesson's work. In Grade 1, cool-downs are included in the lessons with increasing frequency throughout the year.
- **Section Checkpoints:** Each section in grades two and up has a 3-4 Problem Checkpoint to assess the section's learning goals. These are used for extra practice, often replacing a lesson Cool Down, and to check student understanding before the end of the unit.
- **Monitoring Sheets:** Each section also has a monitoring sheet to indicate that students meet the section goals. Each section in kindergarten and Grade 1 has a checklist of indicators that students are meeting the section goals.

Summative Assessment Opportunity:

- **End of Unit Assessments (EOU):** Each unit (starting in Kindergarten, Unit 2) includes an end-of-unit assessment intended for students to complete individually to assess what they have learned after the unit. In K-2, the assessment may be read aloud to students as needed.

Math Discourse and Writing about Mathematical Thinking

IM emphasizes allowing students to think about and talk about mathematical problems and tasks. In every lesson, in each phase of the lesson, teachers will:

- Present a task or problem where student approaches are anticipated ahead of time
- Allow students to first engage in independent think-time, followed by partner or small-group work on the problem.
- Circulate as students are working, noting how groups are using different approaches
- Select groups or individuals in a specific, recommended sequence to share their approach with the class.
- Finally, lead a whole-class discussion to make connections and highlight essential ideas.

In each unit of instruction, teachers will model the use of key academic vocabulary. As the unit progresses, students will ultimately be expected to use that vocabulary to explain their thinking orally and in writing. Our curriculum maps detail the vocabulary to be modeled in each unit.

IM also gives students daily opportunities to explain their mathematical thinking in writing. Each student will make daily use of a student workbook where they will have the opportunity to work through and record their thinking.

Phases of Instruction

All **Tier 1** instruction will follow the IM four-phase lesson sequence

1. Warm-up
2. Instructional Activities (1 to 3)
3. Lesson synthesis
4. Cool-down/Assessment

At the elementary level, after these 4 phases conclude, students also spend time in centers practicing and reinforcing their understanding and fluency.

At the **elementary** level, we will provide 60 minutes/day to complete Tier 1 IM lessons and an additional 20-30 minutes for centers and Tier 2 interventions. At the **secondary** level, 45-55 minutes will be provided daily to complete Tier 1 IM lessons. Each building will provide sufficient additional time for Tier 2 interventions.

Phase 1 - Warm-up:

The first event in every lesson is a warm-up. The warm-up invites all students to engage in the mathematics of each lesson. The warm-ups provide opportunities for students to bring their personal experiences and knowledge to problems and discussions. They value students' voices as they communicate their developing ideas, ask questions, and justify their responses.

A warm-up either:

- helps students get ready for the day's lesson, or
- allows students to strengthen their number sense or procedural fluency

Once students and teachers become used to the routine, warm-ups should take **5–10 minutes**. If warm-ups frequently take much longer, teachers should work on concrete moves to accomplish the warm-up goal more efficiently with the support of the WPS Math Coach.

Phase 2 - Activity

After the warm-up, the lessons consist of one to three classroom activities.

An activity serves one or more of many purposes.

- Provide experience with a new context.
- Introduce a new concept and associated language.
- Introduce a new representation.
- Formalize a definition of a term for an idea previously encountered informally.
- Identify and resolve common mistakes and misconceptions that people make.
- Practice using mathematical language.
- Work toward mastery of a concept or procedure.
- Provide an opportunity to apply mathematics to a modeling or other application problem.
- A description and purpose of each activity are in the lesson narrative.

Elements of Each Activity

Activity Launch:

During the launch, the teacher ensures that students understand the context and what the problem asks them to do.

Students engage with the context to prime them for the cognitive lift of the lesson.

Teachers give clear, concise directions for the activity and outcomes. Teachers can find the allocated timing for each activity in the IM lesson materials.

- The launch is not the same as ensuring students know how to do the problem part of the work. The students should be doing the activities themselves to figure out how to solve the problem. The launch invites students into the lesson and helps them connect to contexts that may be unfamiliar.

Student Work Time:

Students work individually, with a partner, or in small groups during student work time to complete the activity clearly explained by the teacher.

During this time, students:

- Support peer risk-taking
- Efficiently use turn and talks
- Give full attention to partners when speaking
- Value mistakes and incorrect answers as learning opportunities.

Activity Synthesis:

During the activity synthesis, the teacher facilitates time for students to synthesize what they have learned. This time ensures that all students have an opportunity to understand the mathematics of the activity and position the students for new learning within students' previous understanding.

Phase 3 - Lesson Synthesis

After completing activities for the day, students synthesize what they have learned. This portion of class should take **5–10 minutes**. Each lesson includes a synthesis incorporating new insights achieved during the activities. Teachers use this time in any number of ways, including :

- posing questions verbally
 - calling on volunteers to respond
 - asking students to respond to prompts in a written journal
 - asking students to add on to a graphic organizer or concept map
 - adding a new component to a persistent display like a word wall
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Phase 4 - Cool-down

The cool-down task is the last task students complete. Students independently work on the cool-down for about **5 minutes** and turn it in. The cool-down is a brief formative assessment to determine whether students understood the lesson. Students' responses to the cool-downs are used to adjust to further instruction.

Math Centers, Teacher-Led Small Groups, Tier 2&3 Interventions

In K–5, center time is **30-35 minutes** added to regular class time. In grades K-2, centers come before the final synthesis, and in grades 3-5, centers are after the synthesis. It is also time for the teachers to provide tiered instruction.

Math Centers:

Students practice and review math skills at their independent level in small groups or pairs without teacher support

Work will include:

- IM Centers, each of which is set up to provide differentiated independent practice
- Freckle
 - As the implementation progresses and data indicates, other centers may be included, such as:
 - Math journals
 - Additional fluency activities
 - Critical thinking prompts

Teacher-led small group:

Students are receiving targeted instruction to meet their specific needs. Small-Group instruction is where the teacher gives “real-time” feedback to clear up any misconceptions, celebrate a “wrong answer,” and provide feedback on specific student learning goals.

Supports for Teachers

Teachers needing support with instruction, data organization, data analysis, co-planning, or other needs can reach the coach at slapointe@winchendonk12.org