Consider this book your handbook and go-to guide for ensuring equitable, coherent instruction across grades, schools, and your district. You’ll find a number of features throughout the book to aid you in your journey creating a Mathematics Whole School Agreement (MWSA).

### The Math Pact

#### The Book at a Glance

In-depth charts will help you find a consistent approach to preferred and precise mathematical language, notation, representations, rules, and generalizations that will help clarify students’ mathematics understanding.

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**Figure 2.1 - Words that Expire in High School**

<table>
<thead>
<tr>
<th>Words that expire</th>
<th>Expiration details</th>
<th>MWSA-suggested alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don't round up.</td>
<td></td>
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<tr>
<td>Don't round down.</td>
<td></td>
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<tr>
<td>Don't use the word mean.</td>
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<tr>
<td>Use the word estimate.</td>
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**Figure 5.3 - Rules that Expire Commonly Used in High School and Suggested Alternatives**

<table>
<thead>
<tr>
<th>Rule that expires</th>
<th>Expiration details</th>
<th>Suggested alternatives</th>
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<tbody>
<tr>
<td>The absolute value of a number is just the number.</td>
<td></td>
<td>Focus on the definition of absolute value (i.e., its distance from 0 on a number line), and use that language consistently (and require students to use it when discussing absolute value).</td>
</tr>
<tr>
<td>Absolute value is like a magic hat. Whatever you put in comes out positive.</td>
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</table>
WHAT ARE RTEs?
RTEs are a deeply rooted tradition in mathematics education, a means to teach a procedure or strategy in a way that the teacher believes makes the learning easy and fast or helps students remember. Sometimes RTEs are used with the best of intentions as an attempt to make learning "fun." However, let's be clear: RTEs are harmful in the long term and should not be used. We author this list the hard way by teaching those rules to our students only to regret it later when we taught other courses or learned more mathematics content. RTEs caught temporarily seem to help in the short run, but in the long run they support the myth that mathematics is a set of disconnected tricks and shortcuts, is mapped, or is unmanageable. The basic premise of RTEs is to teach the commutative or speed, and the subsequent initial appearance of student success has the commence of teaching those rules. In other words, being able to apply RTEs by rote near or students through the next problem, quiz, test, or high-stakes assessment, making it seem as though there is deep conceptual understanding for a particular mathematical concept is a short formula. Then, when that appearance of success leads us to believe our students understand more than they do, we use the RTE again. In essence, the use of the "trick" or the "shortcut" becomes a self-fulfilling prophecy. Instead, we should teach for the future mathematics we know is coming and emphasize understanding, enduring utility. Instruction that fosters students' depth of understanding builds procedural fluency from conceptual understanding (as described in NCTM, 2014b). Smith et al. (2017) state,

Throughout their mathematical experiences, students should be able to select procedures that are appropriate for a mathematical situation, implement those procedures effectively and efficiently, and reflect on the result in meaningful ways. This procedural fluency, however, is fragile and meaningless without a sound conceptual understanding of the mathematics. Conceptual understanding and procedural fluency are essential and integrated components of mathematical proficiency. (p. 55)

Teaching using RTEs equates to teaching in a way that is often devoid of sound conceptual understanding, which leads to students using procedures in ways that are meaningless and can conceal fragile and often incomplete knowledge. This approach is the opposite of what our students need and deserve.

Effects of using RTEs

Rules that expire:
Tricks, shortcuts, or rules that are used in mathematics that momentarily claim to make math seem easy but do not promote or enhance understanding.

CORE MWSA IDEA
Even actions we take as teachers that seem well-meaning can be harmful in the long run!

CORE MWSA IDEA
Teaching for understanding and long-term utility prepares students to become adults who are mathematically literate.

Why Was I Taught That?

Throughout the book, find definitions of key terms and notes on core MWSA ideas.

Reflection tasks help you consider how key ideas relate to your own instruction.
Try It Out and Things to Do sections provide concrete opportunities to directly engage with your team in creating a Mathematics Whole School Agreement.

Sharing With Stakeholders

As we've been sharing throughout this book, a key component of the MWSA is ensuring that every stakeholder in your high school students' mathematical learning process is informed and on board. Now you'll work to develop some communication tools that will inform everyone in your MWSA community to work together to use appropriate representations.

As you let stakeholders know about the work you are doing, here is a letter that can be shared. This message will help onboard others who might be working with your students, including tutoring services. We suggest that all mathematics teachers and others in the building who are engaged in the teaching of mathematics sign the document.

Available for download in English and Spanish at resources.corwin.com/mathpact-highschool

TRY IT OUT

MWSA HANDOUT FOR REPRESENTATIONS

Representations We Are Using in _____________________________________

<table>
<thead>
<tr>
<th>Representations that may cause confusion</th>
<th>Agreed-on representations in our whole school agreement</th>
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Put It All Together

At this point in your discussions, it is important to think about the rationale for why you need to understand the reasons for using consistent and appropriate representations. As you consider these reasons through the overall lens of the MWSA and advocate for an MWSA in your school or district, here are some key talking points for being consistent in the ways we model mathematical ideas:

- Using consistent representations helps students connect mathematical ideas.
- Incorporating the use of CSA throughout the instructional units builds students' conceptual understanding and mental residue.

Send the Letter

Hello _________,

We have already written to you about the Mathematics Whole School Agreement that we are developing across the entire school this year. As you know, we are all working hard to align our instruction in mathematics across our courses. As you may remember, earlier this year you received a letter where we talked about the mathematical language and notation we use during instruction. We are now looking at the representations we use in mathematics. As a mathematics team, we have agreed on the physical materials we may use to model the mathematics and the ways in which we explain the mathematics by means of pictures or diagrams and mathematical symbols. Everyone in the school involved in the teaching and learning of mathematics is using these and is focused on teaching for students' depth of understanding and connection to mathematical ideas within and across courses. The way we model in mathematics has an effect on the way students understand mathematical ideas. We want your student to become an adult who knows mathematics and will succeed in whatever they choose to do in life. We thank you for joining us in making this shift to be consistent in how we support your student as we prepare them for their personal and professional future!

Thank you for your help,

Your student's teachers and principal