New Features and Functions in *Math Inventory* Version 3.1: Frequently Asked Questions

When is *Math Inventory* version 3.1 available to customers?

Math Inventory version 3.1 will be released early July 2019. All HMH hosted *Math Inventory* customers will automatically receive the update. Legacy customers with local installations will need to access the *Math Inventory* version 3.1 Installer which will be available on the HMH Download Center in July 2019. To ensure the best test experience throughout the 2019-2020 school year, it is imperative that *all* local customers update to *Math Inventory* version 3.1 prior to their fall implementations.

What field test/user testing has been completed for *Math Inventory* version 3.1?

Over the 2018-2019 school year, the *Math Inventory* version 3.1 test design has undergone extensive field testing. Over 129,000 students from 189 schools spanning grades k-12 across all ability levels have completed more than 192,000 assessments to date. Analysis of the real-student test data has confirmed the effectiveness of the enhanced test design and increased precision of the new algorithm.

What are the key benefits of the *Math Inventory* version 3.1?

Our Learning Sciences and Assessment Research teams have identified several enhancements that improve upon *Math Inventory*'s ability to assess student learning and academic growth across all grades.

Specific updates include:

- Calibrating all assessment items to the grade level in which they are administered, allowing the assessment to use more accurate item-difficulty estimates when administering an above/below grade level item to a student. This also helps alleviate the issue of students seeing overly difficult or overly easy items.
- Establishing Item pools for each grade level that contain items that span from two grades below to one grade above the target grade level. All items within a pool have been calibrated based on the item performance by students in the target grade only. For example, the item pool established for 3rd Grade contains items from two grades below (1st and 2nd Grade), on grade (3rd Grade) and one grade above (4th Grade).
- Designing the first five items at the beginning of the assessment attempts to specifically identify a student's ideal starting point a school year each test begins in the same fashion. This provides a more fair and comparable way to quickly establish a student's general math level.
- Adding three additional stages, in addition to the mini-locator test, to *Math Inventory* version 3.1's adaptive stage blueprint design. Performance in the prior stage routes students into one of three different blueprint categories: easy, medium, or difficult. This provides greater control over the grade-level of items served based on performance. Within a stage, students in the easy blueprint do not see above-grade items; students in difficult blueprint do not see items several grades below grade level. At the completion of each stage, student's performance in the prior stage is again assessed and the routing process is repeated. This affords a student the flexibility to traverse several blueprint categories in a single test based on performance. Ability estimate still drives item selection from one item to the next but blueprint (item grade level and strand) adapts based on the overall performance in each stage.

- Fixing assessment length to 30 items with three available skips to decrease the amount of time needed to complete the assessment, mitigating concerns with longer administration times.

How are the established performance bands impacted by *Math Inventory* version 3.1?

As part of the *Math Inventory* version 3.1 development, our Learning Science and Assessment Research teams completed a formal standard-setting study with a team of content and assessment experts. Their examination of *Math Inventory* items, content standards and expected Spring performance, established new cut points between below basic, basic, proficient and advanced performance categories. *Math Inventory* version 3.1 reports will categorize student performance with the new bands. For your convenience, the new *Math Inventory* version 3.1 performance bands can be accessed in the appendix at the end of this document.

In addition to new performance band cut scores, *Math Inventory* version 3.1 now contains Lowest Obtainable and Highest Obtainable Scale Scores (LOSS and HOSS respectively) for each grade. Lowest and Highest scores reflect the highest and lowest difficulty of items within the item pool for any grade. This aligns the content within the item pools with the available scores. Approximately 1% of the overall population would perform at an ability level higher or lower than the LOSS or HOSS. Students who are at the LOSS and HOSS may not show growth from test to test if their results remain at the LOSS or the HOSS.

Progressive Performance Bands are no longer available in *Math Inventory* version 3.1. The program will automatically default to end-of-year bands that define grade-level proficiency as the end-of-year target in Spring.

How does *Math Inventory* version 3.1 impact current and prior placement decisions?

With new performance bands in *Math Inventory* version 3.1, it is important to ensure placement decisions are made using the Performance Bands that accompany the *Math Inventory* version used. For example, placement decisions made using Spring 2019 scores should be informed by the Performance Bands from Spring 2019. Placement decisions made using *Math Inventory* version 3.1 should be informed by the corresponding *Math Inventory* version 3.1 Performance Bands. See appendix for *Math Inventory* version 3.1 Performance Bands.

Similarly, for placement into *MATH 180*, be sure to use the *MATH 180* placement charts that align with the version of Math Inventory taken. For your convenience, placement recommendations using *Math Inventory* version 3.1 into *MATH 180* have been included in the appendix at the end of this document.

As always, no matter which version of the assessment is used, we strongly recommend using *Math Inventory* scores as one of multiple data points when making decisions about instruction, placement, high stakes testing, and teacher evaluation.

How are Spring 2019 administrations of *Math Inventory* comparable to Fall 2019?

As with all adaptive assessments, significant algorithm and test design enhancements impact score comparisons across algorithm versions and, therefore, as best practice, direct score comparisons are not recommended. Similarly, with the enhanced test design and algorithm of *Math Inventory* version 3.1, direct score comparisons will be more useful with go-forward test results. As a result, the reports in *Math Inventory* version 3.1 will contain scores from *Math Inventory* version 3.1 forward. An archive of prior test results will be provided upon request in a secure CSV export document.

How can I access scores for *Math Inventory* tests prior to Back to School 2019?

Archives of prior scores in CSV format are available to districts at no cost. To obtain the free archive of prior scores, a district can contact the HMH Help desk and request their *Math Inventory* archive. Archive requests will be promptly addressed, and provided in a secure and timely fashion.

What are adaptive tests?

Computer-adaptive tests (CATs) are tests that continually adjust the difficulty of each student's test by choosing each question based on the student's previous response. In simplified terms, when the student answers a question correctly, their provisional ability estimate increases and the next item is selected to align with an increased ability estimate. Conversely, if the student answers a question incorrectly, the next item is selected based on a decreased ability estimate. Adaptive tests generally provide a better-targeted assessment experience for students by filtering out the questions that are too difficult or too easy, providing a more precise selection of items appropriate for the student's ability level.

It is important to note that the optimal item for determining a student's ability level is one that has a target probability of correct response at 50%. Students who are accustomed to achieving high success rates on tests (much higher correct response rates) can feel somewhat discouraged when presented with intentionally challenging test questions on adaptive tests like *Math Inventory*.

Educators should remind those students that when an adaptive test gives them a difficult question, it is most likely because they are performing well. They should also encourage students to work hard throughout the entire test experience and not get stuck for too long on any one question.

Can customers still target students in SAM prior to administration?

With *Math Inventory* version 3.1, the items at the beginning of the assessment are designed to specifically identify a student's ideal starting point and, therefore, targeting a student's ability in SAM is no longer necessary, as it is no longer part of the test design, and the targeting functionality has been removed. This will also result in a more accurate starting point and appropriate content for students as they navigate through the assessment.

Will customers using custom performance bands need to reset the bands?

Math Inventory version 3.1 will require customers who currently use custom performance bands to reset the bands after the release goes live.

Will there be incremental updates, or will all enhancements be released at once?

There will be one major release targeted for July 1.

Will these updates also be made in *Reading Inventory*?

No. These updates are only applicable to *Math Inventory*.

How will this update impact *MATH 180* students?

Math Inventory will continue to serve districts' intervention identification needs and will still provide an accurate level of math understanding for *MATH 180* students in the first administration of the assessment. In addition, it will continue to serve as a progress monitor that tracks students' progress over time.

How will districts receive the *Math Inventory* version 3.1 update?

All HMH *Math Inventory* and *MATH 180* customers whose servers are hosted by HMH will automatically update to version 3.1. Locally-hosted customers will need tech plans to stay current in order to receive the *Math Inventory* version 3.1 installer. Both the hosted version and local installer will be available in July 2019.

Appendix

Math Inventory Performance Level Bands

Grade	Below Basic	Basic	Proficient	Advanced
K	EM244 - EM75	EM74 - 8	9 - 117	118 - 295+
1	EM235 - 15	16 - 116	117 - 232	233 - 384+
2	EM233 - 141	142 - 270	271 - 382	383 - 600+
3	EM151 - 276	277 - 380	381 - 545	546 - 815+
4	EM110 - 389	390 - 533	534 - 629	630 - 929+
5	77 - 539	540 - 644	645 - 771	772 - 1045+
6	125 - 659	660 - 784	785 - 890	891 - 1138+
7	393 - 752	753 - 880	881 - 970	971 - 1141+
8	422 - 845	846 - 1000	1001 - 1089	1090 - 1296+
9	680 - 977	978 - 1132	1133 - 1214	1215 - 1459+
10	705 - 1003	1004 - 1215	1216 - 1248	1249 - 1509+
11	705 - 1003	1004 - 1215	1216 - 1248	1249 - 1509+
12	705 - 1003	1004 - 1215	1216 - 1248	1249 - 1509+

MATH 180 Placement Chart