Scholastic Inc: Scholastic Math Inventory

Alignment:

The following alignment is included, as a separate attachment, for the *Scholastic Reading Inventory:*

- Scholastic Math Inventory Supports the Virginia Mathematics Standards of Learning

The Mathematics SOL linking study was conducted in the spring of 2012 in conjunction with the VDOE. The Quantile Linking Tests were administered within two weeks of the Mathematics SOL tests in the same testing window. Linear equating was employed for Grades 3 through 8, Algebra I, Geometry, and Algebra II using a sample acquired by MetaMetrics. Separate linking functions were developed for each grade/course of the Mathematics SOL test.

Table 1. Performance level Quantile measure ranges on the mathematics SOL test.

		Quantile Ranges			
Grade	**Subject**	**Fail/Below Basic**	**Fail/Basic**	**Pass/Proficient**	**Pass/Advanced**
3	Mathematics	425Q and Below	430Q to 620Q	625Q to 910Q	915Q and Above
4	Mathematics	445Q and Below	450Q to 655Q	660Q to 965Q	970Q and Above
5	Mathematics	565Q and Below	570Q to 750Q	755Q to 1035Q	1040Q and Above
6	Mathematics	595Q and Below	600Q to 775Q	780Q to 1145Q	1150Q and Above
7	Mathematics	710Q and Below	715Q to 925Q	930Q to 1230Q	1235Q and Above
8	Mathematics	720Q and Below	725Q to 965Q	970Q to 1385Q	1390Q and Above
	Subject	**Fail/Does Not Meet**		**Pass/Proficient**	**Pass/Advanced**
	Algebra I	1010Q and Below		1015Q to 1420Q	1425Q and Above
	Geometry	1030Q and Below		1035Q to 1390Q	1395Q and Above
		Fail/Does Not Meet		**Pass/Proficient**	**Advanced/College Path**
	Algebra II	1230Q and Below		1235Q to 1515Q	1520Q and Above

Student Growth:

[CHEAD] Growth in Mathematical Understanding

"In the simplest terms, growth is change over time. To study growth, we measure a thing repeatedly on successive occasions and draw conclusions about how it has changed" (Williamson, 2006).

Growth in mathematical understanding can be determined by examining the changes in *SMI* Quantile measures (an equal-interval scale). Using the data collected during the SMI Validation Study – Phase II from six school districts, a data panel was created consisting of students with two or more SMI Quantile measures. A total of 4,116 students were included in the dataset. Table 1, on the next page describes the sample across district by grade and Table 2 describes the data across districts by grade for students with at least three SMI Quantile measures.

Table 1. Description of longitudinal panel across districts, by grade

Grade	*N*	Mean Number of SMI Administrations	Mean Number of Days Between SMI Administrations
2	533	2.6	85.3
3	843	2.6	80.6
4	1,001	2.6	82.6
5	1,062	2.4	91.4
6	677	2.7	80.0
All	**4,116**	**2.6**	**84.2**

Table 2. Description of longitudinal panel across districts, by grade for students with at least 3 Quantile measures

Grade	*N*	Mean Number of SMI Administrations	Mean Number of Days Between SMI Administrations
2	293	3.0	84.3
3	462	3.0	78.0
4	594	3.0	79.7
5	431	3.1	76.4
6	471	3.0	70.4
All	**2,251**	**3.0**	**77.4**

Given the short time span between initial and final assessment, a liner regression model was employed to examine growth in mathematical understanding from the SMI Quantile measures.

Of the panel, students with three or more SMI Quantile measures (N = 2,251, 51.4%) were used in the regression analyses. The slope of the linear regression for each student describes the amount of growth in mathematical understanding per day. The growth estimated from the SMI Quantile measures ranges from 0.5529 to 0.6790, with a mean (weighted) of 0.6138; or, the expected growth in mathematical understanding, as measured by the *SMI*, is about 0.6Q per day. Across grade levels, the R^2 statistics describing the percent of variance in SMI Quantile measures accounted for by the linear model ranged from 52.3% in Grade 5 to 62.9% in Grade 2. Across Grades 2-6, the mean slope estimate is significantly different from zero ($p < 0.0001$).

Table 3. Results of regression analyses for longitudinal panel, across grades

Grade	*N*	Slope of Linear Regression Mean (SD)	R^2
2	293	0.6227 (0.7929)	0.6288
3	465	0.5853 (0.8690)	0.5603
4	594	0.6241 (0.8018)	0.5564
5	431	0.5529 (0.9106)	0.5231
6	471	0.6790 (1.0994)	0.5531

The results in Table 3 describe the amount of growth that can be expected across a school year which is consistent across Grades 2-6 (approximately 0.6Q per day or approximately 108Q per year). These results are consistent with other research conducted by MetaMetrics, with the Quantile Framework showing a near-linear trend between grade level and mathematics achievement as measured on the Quantile scale.

During Phase III of the SMI Validation Study, growth was examined during the 2010-2011 school year. Data collected during the fall administration of SMI was matched with data collected during the spring administration for a sample of 10,178 students in Grades 2-6 from the seven sites. The average growth per day was estimated as 0.67Q (or 120.6Q per year) and ranged from 0.44Q per day in Grade 5 to 0.90Q per day in Grade 3 (the average growth during the school year was 155.998Q and ranged from 101Q to 208Q).

A subsample of 752 students in Grades 2-6 from four sites (Alief, Brevard, Clark, and Harford) had data from both the 2009-2010 school year and the 2010-2011 school year. This group of students grew, on average, 242Q over the two school years (102Q in Year 1 and 153Q in Year 2). As expected, a negative correlation was observed between the student's initial status (*SMI* Quantile measure in winter 2009) and the amount grown over the two school years (r = -.486, p < .0001). This negative correlation is consistent with the interpretation that lower-performing students typically grow more than higher-performing students.

Reporting:

The best reports in SMI to illustrate student growth are:

- Student Progress Report—This report shows a student test history in chart and also features a line graph that shows a quantifiable trajectory of growth. This chart also indicates grade level expectations and Algebra readiness measures.
- Growth Report—This report provides a snapshot of growth by an entire classroom or other cohort group from any two test administration dates.
- Growth Summary Report—This report rolls up classroom-level and grade-level data into a report for administrators.

Examples of these reports are included on the following pages. Examples of other SMI reports can be accessed at: http://teacher.scholastic.com/math-assessment/scholastic-math-inventory/management_system_reports.html.

STUDENT PROGRESS REPORT

Student Progress Report (page 1)

INSTRUCTIONAL PLANNING

Student Progress Report

STUDENT: COOPER, MAYA

School: The Lincoln School
Teacher: Sarah Foster
Grade: 5
Class: 3rd Period
Group: GroupA

1

Time Period: 08/29/12 – 06/02/13

SMI Test History 2 3 4 5

TEST DATE	MATH FACT SCREENER		QUANTILE®	PERFORMANCE LEVEL	NORMATIVE DATA		
	ADDITION	MULTI.			PERCENTILE RANK	NCE	STANINE
02/22/13	●	●	810Q	Proficient	76	65	6
12/13/12	●	●	700Q	Proficient	53	52	5
11/09/12	●	◒	685Q	Proficient	49	49	5
09/28/12	●	◒	650Q	Basic	42	47	5

◒ Indicates possible need for work on math facts. ● Indicates that student is fluent on tested facts.

For students in Grade 9 and above, performance levels describe the performance of students in Algebra I and Math 1.

Using This Report

Purpose: This report shows a student's SMI test history. It also provides instructional recommendations based on the last test in a time period. SMI reports Performance Levels for students in grades 2-12. Other grades are not assigned Performance Levels.

Follow-Up: Share information with individual students, noting changes in performance from test to test. Investigate any significant decline in progress. For instructional planning, utilize information provided in Instructional Recommendations.

DATA IN ACTION

This report provides a history of student results. Teachers can change date ranges to receive a multi-year history of a student's growth.

FOLLOW UP

This report is useful for parent meetings and collaboration with other educators.

Using the Data

Who: This report is for teachers.

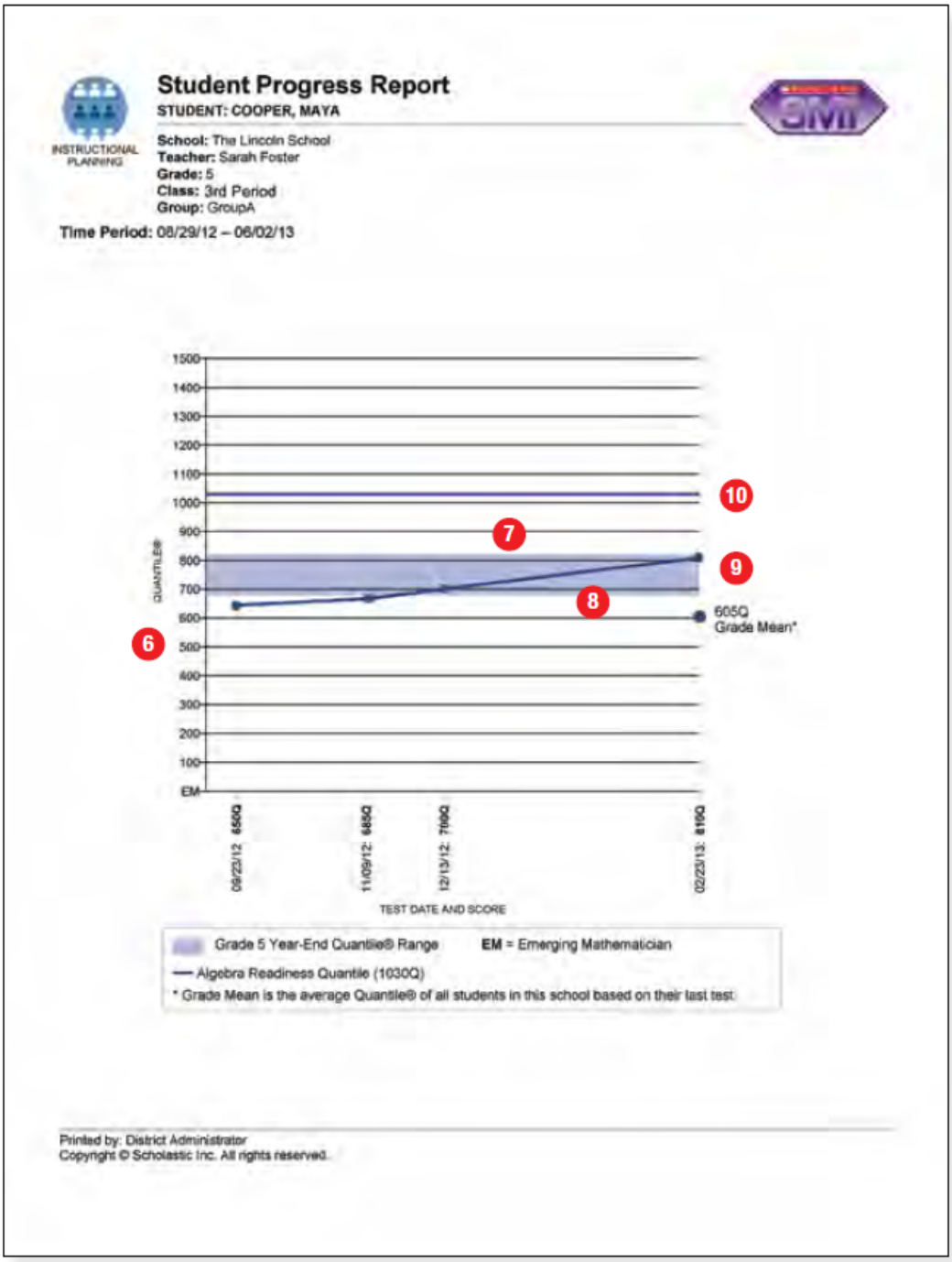
What: This report shows a student's SMI test history. It also provides instructional recommendations based on the last test in a time period.

When: This report is best generated after each SMI test administration.

Understanding the Data

1. **Header:** The student's name is listed at the top of the report, followed by related school information and the time period covered by the report.
2. **Math Fact Screener:** Addition and multiplication fact screener results are shown for each of the student's completed SMI tests in the selected time period.
   - ◒ Indicates possible need for work on math facts.
   - ● Indicates that student passed tested facts.
3. **Quantile:** The student's Quantile measure for each test is shown.
4. **Performance Level:** This column shows the student's math achievement level based on the SMI Performance Levels: Advanced, Proficient, Basic, and Below Basic.
5. **Normative Data:** Percentile rank, normal curve equivalent (NCE), and stanine are shown for each student based on school/district data.
   - **Percentile Rank:** A score that tells what percent of students in a particular group received lower scores than this student. Percentiles range from 1 to 99.
   - **Normal Curve Equivalent (NCE):** A normalized score with a mean of 50 and a standard deviation of 21.06. NCEs range from 1 to 99.
   - **Stanine:** A standardized score with a mean of 5 and a standard deviation of 2. Stanines range from 1 to 9.

Student Progress Report (page 2)



Student Progress Report

STUDENT: COOPER, MAYA

INSTRUCTIONAL PLANNING

School: The Lincoln School
Teacher: Sarah Foster
Grade: 5
Class: 3rd Period
Group: GroupA

Time Period: 08/29/12 – 06/02/13

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Understanding the Data (continued)

6. **Line Graph:** The line graph provides a snapshot of student performance. It shows Quantile measures in 100-unit increments along the vertical axis and SMI test dates and scores along the horizontal axis.
7. **Graph Data:** Each point on the graph represents a student SMI test result. The date of each test and the score are shown on the horizontal axis.
8. **Year-End Proficiency Range:** The shaded area on the graph represents the range of scores that is defined as Proficient at the end of each grade level.
9. **Grade Mean:** The grade mean is the average score of all students in the same grade and school based on their latest SMI tests.
10. **Algebra Readiness:** This point on the line graph indicates readiness for algebra instruction.

Student Progress Report (pages 3-4)

Student Progress Report

STUDENT: COOPER, MAYA

INSTRUCTIONAL PLANNING

School: The Lincoln School
Teacher: Sarah Foster
Grade: 5
Class: 3rd Period
Group: GroupA

Time Period: 08/29/12–06/02/13

Instructional Recommendations for Maya 11

12 **Focus on Math Facts**

The math fact screener indicates that Maya may need to work on quick retrieval of multiplication facts. Go to www.scholastic.com/SMI for additional information and instructional support.

13 **Focus on Critical Foundations**

For a student with a Quantile® of 10Q, focus on the skills and concepts indicated below. Quantile measures refer to the level of difficulty of a math skill and concept, or to a students' level of readiness for instruction. The QTaxon ID is a look-up number for the particular QTaxon found within The Quantile Framework. A QTaxon is a math skill or concept in the Quantile Framework. To access the SMI MATH DATABASE for math instructional resources go to www.scholastic.com/mathdatabase or www.Quantiles.com. The Common Core State Standards ID represents alignment with QTaxons.

SKILLS AND CONCEPTS	QTAXON ID	COMMON CORE STATE STANDARDS ID
Number and Operations: Whole Numbers		
Estimate and solve division problems with 2- and 3-digit divisors; explain solution.	QT-N-171	6.NS.B2
Find fac factor o		
Identify		
Read, w exponer		
Use ren interpre problem		
Number a		
Compar		
Identify level, in equivale		
Add and		
Write a proporti		
Multiply number		

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Student Progress Report

STUDENT: COOPER, MAYA

INSTRUCTIONAL PLANNING

School: The Lincoln School
Teacher: Sarah Foster
Grade: 5
Class: 3rd Period
Group: GroupA

Time Period: 08/29/12–06/02/13

SKILLS AND CONCEPTS	QTAXON ID	COMMON CORE STATE STANDARDS ID
Geometry and Measurement		
Identify and name: points, rays, line segments, lines, and planes.	QT-G-173	4.MD.C5.a
Identify and label the vertex, rays, and interior and exterior of an angle. Use appropriate naming conventions to identify angles.	QT-G-203	N/A
Classify plane figures according to type of symmetry (line, rotational).	QT-G-205	N/A
Name polygons by the number of sides. Distinguish quadrilaterals based on properties of their sides or angles.	QT-G-620	5.G.B3

Understanding the Data (continued)

11 **Instructional Recommendations:** Instructional recommendations focused on critical foundations are also given for each student. These recommendations are based on the student's Quantile measure. Go to www.scholastic.com/SMI for additional information and instructional support.

12 **Focus on Math Facts:** Instructional recommendations are provided when students do not pass (80% correct) math facts in the high-level math screener.

13 **Focus on Critical Foundations:** In addition to indicating the student's Quantile measure, SMI reports on skills and concepts as represented in QTaxons on math concepts the student is ready to learn. Skills and concepts align to the Common Core State Standards math identifier.

Time Period Settings

This report includes the results of all SMI tests taken during the chosen time period. Make sure the time period setting you choose covers the student's latest SMI test administration. The default period is **This School Year**. Grading periods, weekly, and custom settings are also available.

Related Reports

Run the following report for a complete printout of the last student test:

- Student Test Printout

GROWTH REPORT

Growth Report

PROGRESS MONITORING

Growth Report (1)

TEACHER: SARAH FOSTER

School: The Lincoln School
Grade: 5

Time Period: 08/29/12–06/02/13

STUDENT	GRADE	FIRST TEST IN SELECTED TIME PERIOD (2)			LAST TEST IN SELECTED TIME PERIOD (3)			ACTUAL GROWTH IN QUANTILE®* (4)
		QUANTILE®	PERFORMANCE LEVEL	DATE	QUANTILE®	PERFORMANCE LEVEL	DATE	
Gainer, Jacquelyn	5	925Q	Proficient	12/13/12	1100Q	Advanced	02/22/13	175
Hartsock, Shalanda	5	595Q	Basic	12/13/12	750Q	Proficient	02/22/13	155
Cho, Henry	5	955Q	Advanced	12/13/12	1110Q	Advanced	02/22/13	155
Cooper, Maya	5	700Q	Proficient	12/13/12	810Q	Proficient	02/22/13	110
Robinson, Tiffany	5	390Q	Below Basic	12/13/12	485Q	Below Basic	02/22/13	95
Cocanower, Jaime	5	640Q	Basic	12/13/12	710Q	Proficient	02/22/13	70
Garcia, Matt	5	615Q	Basic	12/13/12	680Q	Proficient	02/22/13	65
Terrell, Walt	5	670Q	Basic	12/13/12	720Q	Proficient	02/22/13	50
Enoki, Jeanette	5	750Q	Proficient	12/13/12	800Q	Proficient	02/22/13	50
Morris, Timothy	5	620Q	Basic	12/13/12	650Q	Proficient	02/22/13	30
Collins, Chris	5	195Q	Below Basic	12/13/12	220Q	Below Basic	02/22/13	25
Ramirez, Jeremy	5	580Q	Basic	12/13/12	600Q	Basic	02/22/13	20

*Scale for bar chart is based on highest Quantile® growth.
Expected growth in grade 5 is 85Q.

For students in Grade 9 and above, performance levels describe the performance of students in Algebra I and Math 1.

Using This Report

Purpose: This report measures student Quantile growth between two SMI tests in a selected time period. SMI reports Performance Levels for students in grades 2-12. Performance Levels for students in other grades are not included in this report.

Follow-Up: Provide opportunities to challenge students who show significant math progress. Plan appropriate levels of intervention and support for students who are not making adequate progress.

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DATA IN ACTION

Teachers can use this report to understand effectiveness of instruction and if a student's math intervention is working.

FOLLOW UP

This report is a perfect collaboration tool across the tiers of instruction.

Using the Data

Who: This report is for teachers.

What: The Growth Report measures student Quantile growth between two SMI tests in a selected time period.

When: This report is best generated every 9 to 12 weeks and whenever a majority of students in a class or group have completed at least two SMI test administrations.

Understanding the Data

1. **Header:** The grade, teacher, class, or group is listed at the top of the report, followed by related school information and the time period covered by the report.
2. **First Test in Selected Time Period:** Quantile measure, Performance Level, and test date are shown for the first SMI test in the selected time period.
3. **Last Test in Selected Time Period:** Quantile measure, Performance Level, and test date are shown for the last SMI test in the selected time period.
4. **Actual Growth in Quantile:** This column shows increase in Quantile measure between the first and last tests in the selected time period.

Time Period Settings

This report is based on the first and last SMI tests taken during the chosen time period. Make sure the time period setting you choose covers at least two SMI test administrations. If your students have taken more than two SMI tests, you may wish to run separate reports isolating the different dates. The default period is **This School Year**. Grading periods and custom settings are also available.

Related Reports

Run the following reports for more information on students who have incomplete tests, student growth, and Performance Levels, and for a complete printout of the last student test:

- Incomplete Test Report
- Intervention Grouping Report
- Student Test Printout
- Student Progress Report

GROWTH SUMMARY REPORT

Growth Summary Report (Page 1)

PROGRESS MONITORING

Growth Summary Report

DISTRICT: EASTERN REGIONAL SCHOOL DISTRICT

1

Time Period: 08/29/12 – 06/02/13

Total Schools: 1
Total SMI Students: 338
Average Quantile® Growth: 139

2

3 4 5

Eastern Regional School District (338 total students)

SCHOOL	FIRST TEST SCORE (AVG.) IN SELECTED TIME PERIOD	LAST TEST SCORE (AVG.) IN SELECTED TIME PERIOD	AVERAGE GROWTH IN QUANTILES®
The Lincoln School	633	772	139

The Lincoln School (338 total students)

GRADE	FIRST TEST SCORE (AVG.) IN SELECTED TIME PERIOD	LAST TEST SCORE (AVG.) IN SELECTED TIME PERIOD	AVERAGE GROWTH IN QUANTILES®
First grade	EM	103	110
Second grade	6	118	112
Third grade	169	229	60
Fourth grade	365	455	90
Fifth grade	545	659	114
Sixth grade	638	702	64
Seventh grade	735	814	79
Eighth grade	842	953	111
Ninth grade	926	1,087	161
Tenth grade	1,081	1,328	247
Eleventh grade	1,152	1,420	268
Twelfth grade	1,146	1,400	254

Using This Report

Purpose: This report measures Quantile growth over time, between two SMI test dates in a selected time period, by district broken down by school, and by school broken down by grade and teacher/class.

Follow-Up: Identify schools, or individual grades or classes within a school, that are not showing adequate growth over time and provide extra help to optimize SMI performance.

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DATA IN ACTION

Administrators can see in actual Quantile measures where progress is being made.

FOLLOW UP

This data is useful for Curriculum Planners and Coaches.

Using the Data

Who: This report is used by school and district administrators.

What: The test activity provides aggregated data on student growth over time. The report can be accessed on the district or school level.

How: Administrators can monitor growth rates to ensure students are on track to meet algebra readiness expectations and college and career readiness expectations.

Understanding the data

1. **Header:** Select if you want to run this report for a district, school or grade. When generating a report on the district level, the district data is displayed at the top of the chart followed by the school results. When generating a report on the school level, the school results are displayed on the top of the chart, followed by the results for each grade.
2. **Students Enrolled in SMI:** This area of the report shows the total number of students per school, grade, and teacher, and students who have completed at least two SMI tests within a selected time period.
3. **First Test Score Average in a Selected Time Period:** The average Quantile measures of the first test for students with at least two SMI tests are reported here. This date can be customized.
4. **Last Test Score Average in a Selected Time Period:** The average Quantile measures of the latest test for students with at least two SMI tests are reported here. This date can be customized.
5. **Average Growth in Quantile Measures:** Average growth in Quantile measures between the two selected test administration dates is reported here.

Technology:

1. *For online testing, can portable devices (tablets, iPads, netbooks) be used with the same fidelity as CPUs/laptops?*

   Currently, Scholastic does not support tablets or iPads, although our Development Roadmap includes iPads for the 2013-2014 school year for many Scholastic Education products. Some schools have had success with Netbooks, although they are not on the "officially supported" hardware list for student workstations. Current Technical Specifications can be found at www.scholastic.com/productsupport.

2. *Can reports be accessed with fidelity from portable devices 24 hours a day, 7 days a week?*

   Reports can be accessed anytime/anywhere through our Scholastic Data Center, from approved devices. A list of our current Technical Specifications can be found at www.scholastic.com/productsupport.

3. *Expand on the technology information to include specific requirements about technology infrastructure related to bandwidth, caching capabilities, numbers of concurrent testers, redundancy of data storage as well as fail-safe protocols during testing windows.*

   Scholastic Education uses a benchmark bandwidth figure of 100 kb/second per user. This is an average bandwidth measurement across all products. *Scholastic Math* Inventory (SMI) and *Scholastic Reading Inventory* (SRI) are not as "media intensive" as our products such as *System 44* and *READ 180*. The bandwidth required by SMI and SRI is well below that of our typical bandwidth needs. To determine concurrency, determine the number of users in the program at any one time and multiply that number times 50 kb/sec. This should be a reasonable estimate for bandwidth needs. The Scholastic Data Center has resilient and redundant systems in place to maintain 99% "up-time" for schools. This includes, but is not limited to, redundant ISP providers, back-up electrical systems, and a secondary Data Center for catastrophic events. Maintenance is scheduled during off-peak school hours and backup procedures include on-site as well as off-site storage. Additional information regarding the Scholastic Data Center can be provided as needed.

4. *During online testing, will remote "live-time" diagnostic assistance be provided? If so, describe this assistance.*

   Scholastic provides Technical Support during school hours of 7am – 8pm ET. Remote assistance is available through Tier 2 and Tier 3 Help Desk Agents. End-users can call, email or chat with Tech Support Agents. On-site support is offered through Scholastic's Nation-wide Field Engineering Team for Premium Support and Scholastic Hosted customers, should remote troubleshooting not solve reported issues.

5. *What level of local IT support should the division expect in each school/classroom in order to appropriately support successful testing?*

   Scholastic offers a wide range of Product Maintenance and Support Packages to meet the diverse needs of our customers. Additional information on these plans is found on our website (www.scholastic.com/productsupport). Scholastic Hosted Customers are automatically included in the Premium Product Maintenance and Support Package. This includes phone, email and chat support as well as 24/7 online support. On-site Field Engineering support is available at no charge for issues that cannot be solved through remote assistance.

Availability:

The *Scholastic Math Inventory* is currently available for operational use.