REPORT from Renaissance Learning

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Matching Books to Students

How to Use Readability Formulas and Continuous Monitoring to Ensure Reading Success

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Introduction

Many studies have found that reading practice has a positive effect on reading achievement.[1] However, simply increasing time allocated to reading practice might not be effective in raising achievement. Students need to spend time *successfully* engaged in reading activities to benefit from the experience (Berliner, 1990).

Ensuring that students are successfully engaged with reading materials requires guidance and continuous monitoring from educators. Matching reading materials to students is a four-step process: (1) estimate text readability, (2) measure student level of reading achievement, (3) determine the appropriate reading range for independent reading, and (4) continuously monitor comprehension and adjust book levels and genre. Readability formulas and reading achievement tests can help educators with the first two steps by providing measures of book difficulty and student reading ability; however, due to the measurement error inherent in both readability formulas and reading tests, these are approximations. The second two steps are even more important: Educators must determine the appropriate reading range for students and then monitor how well students comprehend the books they read. Students' success with books, their areas of interest, appetite for challenge, and other factors provide the data educators need to guide students' book selection and ensure that students get the greatest benefit from their reading practice.

Renaissance Learning equips educators with research-based tools to help with this process:

- ATOS, a highly accurate measure of text readability specifically designed for books, is an open system educators use to begin the process of matching books to students.
- The Accelerated Reader (AR) Goal-Setting Chart (see Appendix A) links a grade-equivalent measure of student reading achievement from any norm-referenced reading test to the appropriate reading range for a student.
- Accelerated Reader and AR Best Practices guide continuous progress monitoring and personalization of reading practice to help teachers ensure students are reading books with a high level of success and comprehension.

[1] E.g., Anderson, 1996; Cunningham & Stanovich, 1991, 1997; Elley, 1992; Elley & Mangubhai, 1983; Leinhardt, 1985; Lewis & Samuels, 2003; Samuels & Wu, 2004; Shany & Biemiller, 1995; Taylor, Frye, & Maruyama, 1990.

Step 1: Selecting and Using a Readability Formula

Overview of readability formulas

Readability formulas provide educators with an estimate of the difficulty of books and other text. While there are many formulas from which educators may choose, all are based on similar factors. Most readability formulas incorporate two components: (1) semantic difficulty, often measured by word length, word familiarity, or word frequency, and (2) syntactic difficulty, often measured by sentence length—the average number of words per sentence. As a result, the formulas tend to measure similar factors, correlate well with one another, and, on average, yield only slight differences.

Readability formulas also all tend to have the same limitations. While, on average, all readability formulas tend to produce the same results, there can be a high degree of variation in published readability levels for a particular book. Readability formulas, like reading tests, contain "sampling error"—the variability that results from trying to estimate the whole of something by measuring only a part. For example, before the relatively recent availability of high-speed text scanners, it was impossible to analyze entire books, so readability analyses were done using samples of text. Since books can vary widely in reading level from section to section, the error introduced by text sampling can be significant.

Error also results from the fact that readability formulas cannot truly measure everything that contributes to how readable a book is for a student, any more than reading tests can truly measure the whole spectrum of a student's reading behavior. Readability formulas cannot measure context, prior knowledge, interest level, difficulty of concepts, or even coherency of text. For example, look at the following two passages:

> *Four score and seven years ago our fathers brought forth upon this continent a new nation, conceived in liberty and dedicated to the proposition that all men are created equal. Now we are engaged in a great civil war, testing whether that nation or any nation so conceived and so dedicated can long endure.*
>
> *Endure long can dedicated so and conceived so nation any or nation that whether testing, war civil great a in engaged are we now. Equal created are men all that proposition the to dedicated and liberty in conceived, nation new a continent this upon forth brought fathers our ago years seven and score four.*

Obviously, the first passage is the first two sentences of Lincoln's Gettysburg Address. The second passage is the same text backward. All readability formulas would rate these two passages exactly equal, even though the second is gibberish. The simple truth is that no readability formula is completely accurate in measuring the readability of text; rather they provide initial estimates for trained educators who know their students. This is why matching books to students is more than just assigning numbers to students and books: It is a process that requires professional judgment.

While most readability formulas produce similar results and have similar limitations, there are a few points on which they differ that should be taken into account when choosing a formula. Table 1 compares six common readability formulas on semantic and syntactic components used, type of scale, sampling technique, and other notable features. While all readability formulas contain a semantic component, some semantic variables are more highly correlated with text difficulty than others. For example, word frequency is not as strong a predictor of text difficulty as word length or the grade level of a word (see Table 2).

Most readability formulas are designed for text in general versus text as it appears in books. This is a particular problem with early reader books, which can have unusually long sentences or vocabulary that is common only in early elementary grades. These issues are addressed by the ATOS for Books Readability Formula, the only readability formula specifically designed for books.

Readability formulas also differ as to the type of scale used. Some formulas report the difficulty of books with their own unique scales. Most teachers and librarians prefer grade-level scales because they are easy to understand and use in communicating with students and parents.

Table 1: Comparison of Popular Readability Formulas

	ATOS for Books	Dale-Chall	Degrees of Reading Power (DRP)	Flesch-Kincaid	Fry Index	Lexile Framework
Developer	Renaissance Learning	Edgar Dale and Jeanne S. Chall (Chall & Dale, 1995; see also Chall et al., 1996)	Touchstone Applied Science Associates (Koslin, Zeno, & Koslin, 1987; Zeno et al.,1995)	Rudolf Flesch and J. Peter Kincaid (Flesch,1948; Kincaid et al., 1975)	Edward Fry (1968)	MetaMetrics, Inc. (Stenner, 1996)
Scale type	Grade-level scale	Grade-level scale or cloze score	0–100 scale	Grade-level scale	Grade-level scale	10–1900 scale
System type	Open	Open	Closed	Open	Open	Closed
Syntactic component	Average sentence length	Average sentence length	Average sentence length	Average sentence length	Average sentence length	Average sentence length
Semantic components	- Average word length - Average grade level of words	Percentage of words found on the revised Dale word list (words familiar to fourth-grade students)	- Percentage of words found on the revised Dale Long List - Average word length	Average number of syllables per word	Average number of syllables	Average word frequency
Sampling technique	Full text	One 100-word sample for each 50 pages	Three to fifteen 300-word samples	Any sampling technique may be used	Three 100-word passages	Initially 20 random pages (Stenner & Burdick, 1997); now uses full text
Other notes	Open system that puts both reader and text on the same scale	Word list and formula revised in 1983	Uses Bormuth formula (Bormuth 1969, 1971)	Used by IRS, Social Security Administration, and insurance policies	Easiest formula to use without electronic implementation	Must use a Lexile reading test or Lexile-licensed test to match a student to a book

Table 2: Correlation of Semantic and Syntactic Variables to Text Difficulty

Variable	Correlation
Words per sentence*	0.95
Average grade level of words*	0.94
% familiar words	-0.93
Syllables per word	0.92
Characters per word*	0.92
Word frequency	0.88

** Variables used in ATOS*

Another important way readability formulas differ is whether they are "open" or "closed" systems. Teachers and suppliers of reading materials to schools typically prefer open systems—formulas that can be applied to any material and for which neither they nor the text publisher pay a fee, allowing teachers and school districts to use materials depending on preference and need. Teachers have the flexibility to use one readability formula for textbooks and another for trade books. In addition, tools such as the AR Goal-Setting Chart (p. 10), which express book readability on a grade-level scale, allow teachers to use students' grade-equivalent scores from any nationally normed reading test to help students find appropriate books to read. Examples of open systems include the Dale-Chall, Flesch-Kincaid, Fry, and ATOS readability formulas.

Development of the ATOS for Text Readability Formula

In 1998, Renaissance Learning, in conjunction with Touchstone Applied Science Associates (TASA), now called Questar Assessments, Inc., began developing a new, improved readability formula to give teachers and students a better tool for estimating text difficulty, particularly the readability of books, which had never been done before. The partnership with TASA—known for their highly respected Degrees of Reading Power test and readability scale—gave the project a large set of reading-test items for development and validation of the new formula.

The project team began by analyzing dozens of characteristics of text to determine which were most highly correlated with text difficulty.[2] A wide range of semantic and syntactic variables, from average sentence length to amount of punctuation and word length to word frequency, were investigated. The correlation of text difficulty to some of the most common readability variables are shown in Table 2 (previous page). The semantic variable most highly correlated with text difficulty was average grade level of words. Word frequency, the semantic variable used by The Lexile Framework, had a weaker correlation with passage difficulty than other common semantic variables, including word length and average grade level of words.

This may be because many words that are relatively uncommon in English language are actually very familiar to younger readers. For example, kitten is only moderately common in the English language (Zeno, Ivens, Millard, & Duvvuri, 1995), but it is typically learned by the first grade. Thus Lexile levels for books that use words like kitten will frequently be artificially high.

After examining the relationship between individual variables and text difficulty, many combinations of variables and their derivatives were examined. The simple combination that did the best job of accounting for variation in text difficulty consisted of three variables: average sentence length, average vocabulary grade level of words (excluding the 100 most common words), and average word length. These variables form the ATOS for Text Readability Formula. This model was then validated using STAR Reading computer-adaptive standardized test passages. Since these passages tend to be short (many are 30 words) passages were combined to form 35 longer selections of text. The ATOS for Text Readability Formula was a good predictor of the difficulty of these longer selections ($R^2 = 0.96$).

Vocabulary list.

The ATOS formulas use a unique measure of word difficulty compared to other readability formulas: grade-level difficulty of the words. This is computed by looking up the difficulty of the words in a book on a special vocabulary list containing more than 23,000 words developed specifically for ATOS. This new, improved graded vocabulary list reflects temporal change in the vernacular lexicon and incorporates the derivatives of words. Derivatives of words have been typically omitted from such lists in the past, or assumed to function at the same grade level as the root word, either of which might have skewed the outcome. The new list is a synthesis of several sources, including the revised Dale familiar word list (Chall & Dale, 1995), the Educator's Word Frequency Guide (Zeno, Ivens, Millard, & Duvvuri, 1995), and the Renaissance word frequency corpus.[3] Words from these lists and their derivatives were painstakingly reviewed by vocabulary experts to determine correct grade-level placements, which were then validated through comparisons to words used at various grade levels on major standardized tests.

[2] The passages used were 225 DRP cloze passages. Text difficulty was the average difficulty parameter of the items comprising the passage, where the parameters were measured in Rasch logit units.

[3] At the time of ATOS development, Renaissance Learning's word frequency corpus consisted of 474 million words representing all text in 28,000 K–12 books in the Renaissance Learning quiz library. These are authentic books read by real students. As of this writing, the Renaissance Learning word frequency corpus is much larger, consisting of more than 100,000 books and more than one billion words.

Development of ATOS for Books Readability Formula

The ATOS for Text Readability Formula, like other readability formulas, was developed using test-item data. However, there are large differences between the experience of reading books and other authentic text and reading test items. Thus, adjustments were made to ATOS for Text to create the ATOS for Books Readability Formula based on real data from actual book reading experiences.

A key difference between authentic text from books and test-item text is that authentic text is much more variable in terms of sentence length, a common measure of difficulty. For example, the difficulty of books that have long sentences, but easy vocabulary is often overstated with readability formulas. ATOS dampens the effect of sentence length for books and passages with this characteristic.

By incorporating book length (number of words), another important variable not previously used in readability formulas, ATOS for Text becomes the ATOS for Books Readability Formula, the most accurate formula for book leveling. Analysis of the national Reading Practice Database[4] indicated that longer books are generally harder to read than shorter books with similar text characteristics. Teachers have always known this and have taken length into consideration when recommending books to students. Likewise, ATOS for Books adjusts the readability level of books down for shorter books and up for longer books.

Nonfiction, high-interest/low-readability, and emergent reader books.

Data from the national Reading Practice Database also enabled validation of ATOS for Books on different types of books including nonfiction, high-interest/low-readability books, and emergent reader books. Analysis showed the Flesch-Kincaid formula tends to understate the difficulty of nonfiction—possibly because nonfiction often contains specialized vocabulary, which is not properly analyzed by just looking at word length. Since ATOS accounts for differences in vocabulary level, the readability levels for nonfiction books using ATOS for Books are higher than fiction books with the same Flesch-Kincaid levels.

Analysis of actual student reading results for high-interest/low-readability, or high/low, books and teacher feedback indicated the readability levels of these books are generally too high. Because high/low books are generally shorter in length and ATOS for Books takes book length into consideration, readability levels of these books are slightly lower using ATOS for Books than the Flesch-Kincaid formula.

Books written for emergent readers have always presented a problem for readability formulas. As mentioned earlier, the structure of these books is such that they may contain one or two very long sentences. Most readability formulas would overstate the difficulty of these books, but the adjustments for extreme sentence length and book length used in ATOS result in more accurate levels. In addition, these books often use words that are not very common in the English language in general, but are very well known to young children, such as kitten or puppy. By using a measure of the vocabulary level of the words rather than just word length or word frequency, the ATOS levels for emergent reader books are more accurate than the levels produced by other readability formulas.

Key strengths of ATOS for Books.

ATOS for Books has several advantages over other readability formulas:

- It is an open system meaning (most importantly) that to make the first match of books to students, educators are free to use any standardized test for estimating student reading ability. Renaissance Learning's Goal-Setting Chart provides guidance, in the form of suggested reading ranges, that educators need to make the initial match. ATOS is also free. There is no charge to the user, book, or text publishers for its use.

[4] At the time of ATOS development, the database contained Accelerated Reader and reading standardized test records for more than 30,000 students who read and tested on 950,000 books. As of this writing, the database contains records for 4,782,912 students who read and tested on 99,069,201 books.

- By incorporating adjustments for book length and unusual sentence length, ATOS for Books is uniquely suited for estimating the readability of books K–12 students are likely to encounter.
- Compared to other readability formulas, ATOS for Books works especially well with books for emergent readers. Other formulas often overstate the difficulty of emergent reader books. For example, *Five Little Kittens,* by Nancy Geller Jewell, is a 32-page picture book. The sentences are slightly long and the word kitten is used repeatedly. The publisher labels this book as appropriate for grades K–3, ages 5–8.[5] This book has a Flesch-Kincaid level of 4.6 and a Lexile level of 970,[6] which equates to grades 6–7 (Metametrics, 2003). This is the same range that includes books such as *Dogsong,* by Gary Paulsen, and *Exploring the Titanic,* by Robert Ballard. The ATOS level for *Five Little Kittens* is a much more reasonable 2.6. By measuring vocabulary level and adjusting for longer sentence length, ATOS produces a more accurate readability level than Flesch-Kincaid or Lexile.
- ATOS for Books has been validated for use with other categories of books that present special challenges including nonfiction books and high-interest/low-readability books.
- A panel of experts periodically reviews the reading levels provided by ATOS for reasonableness. Renaissance Learning occasionally makes adjustments based on standardized rubrics for certain books where it is obvious the readability formula is not fully accounting for text difficulty. These rubrics are applied to many of the classics, including books by English or foreign authors, poems, plays, and early American literature. However, these adjustments are applied sparingly: Fewer than 1% of books have been adjusted.

Correlation of ATOS to other readability formulas

While two readability formulas may yield very different results for a particular book, as explained above for emergent readers, in general, different formulas are highly correlated. Table 3 shows correlations between ATOS for Books, Bormuth (the basis for TASA's Degrees of Reading Power Readability Formula or DRP), Dale-Chall cloze scores, Flesch-Kincaid, and Lexile. The strength of the correlations range from 0.80 to 0.97, and all of the correlations are statistically significant ($p < 0.001$).

As a service to educators who may want, or be required, to use other readability formulas, ATOS for Books readability values can be expressed on a 100-point scale (similar to the DRP scale) and a 2000-point scale (similar to the Lexile scale). In addition, Renaissance Learning provides conversion charts for other popular readability formulas including Reading Recovery, Guided Reading, and Flesch-Kincaid. See Appendix B for these charts.

Table 3: Correlation of Popular Readability Formulas
(n = 19,762; $p < 0.001$ for all correlations)

	ATOS for Books	Dale-Chall* Cloze Score	Flesch-Kincaid	Lexile
Bormuth*	-0.88	-0.84	-0.97	0.80
Dale-Chall*	-0.86	-0.88	-0.86	
Flesch-Kincaid	0.89	0.85		
Lexile	0.91			

** On the Bormuth and Dale-Chall Cloze Score scales, a lower number indicates the text is more difficult; therefore, correlations with other formulas will be negative.*

More about the development of ATOS is available in a separate publication from Renaissance Learning, *The Development of ATOS: The Renaissance Readability Formula* (Milone, 2009), available online from http://doc.renlearn.com/KMNet/R004250827GJ11C4.pdf

[5] Retrieved September 14, 2005, from http://www.houghtonmifflinbooks.com/catalog/titledetail.cfm?titleNumber=111835

[6] Retrieved September 14, 2005, from http://www.lexile.com/DesktopDefault.aspx?view=ed&tabindex=5&tabid=67&bookid=1606&pageindex=1

Step 2: Estimating Student Level of Reading Achievement

Matching books to students requires that the educator have an estimate of both text difficulty and student level of reading achievement. To estimate student reading achievement, the educator ideally should have access to recent reading scores. Renaissance Learning's STAR Reading, a computer-adaptive reading test, is particularly helpful in this regard as it enables educators to instantly and accurately assess reading scores for all students, grades 1–12 (Renaissance Learning, 2010). District- and state-mandated tests are less desirable for two reasons: (1) Results are often not available until months after the administration of the test and student reading ability can change rapidly, and (2) state tests typically have a narrower range of item difficulties, meaning the results for students whose reading skills are very advanced or very behind are less accurate than a computer-adaptive test and many nationally normed tests.

Step 3: Recommended Reading Ranges

After selecting a measure of text readability and estimating a student's level of reading achievement, the next step is to determine an appropriate independent reading range for the student. Renaissance Learning provides educators with a tool to help select appropriate reading ranges: the Accelerated Reader Goal-Setting Chart. This chart provides suggested ranges of book difficulty for students' grade-equivalent (GE) scores from any norm-referenced standardized test of reading achievement.

The reading ranges on the AR Goal-Setting Chart are based on the theoretical concept of zone of proximal development, or ZPD (Vygotsky, 1978). In independent, literature-based reading, a ZPD is the range of books that will challenge a student without causing frustration or loss of motivation. The ranges on the AR Goal-Setting Chart become increasingly broad the higher the GE score. This recognizes that not all important literature necessarily has a high reading level, and that even when students are proficient readers it is important they read a wide variety of books. The use of wide reading ranges ensures students have access to a large selection of books that are interesting to them.

The ZPD ranges on the AR Goal-Setting Chart were developed and have been updated using actual student reading data (Renaissance Learning, 2003). The ranges were also validated through a sophisticated analysis of reading data from more than 50,000 students (Borman & Dowling, 2004). This research showed that students who read within their ZPD range experienced greater gains in reading achievement than students who read below their ZPD range. And students who read above their ZPD may also experience gains, as long as they are reading with a high level of comprehension.

The Lexile Framework also provides recommended reading ranges (Metametrics, 2003). The ranges, however, are higher than those on the AR Goal-Setting Chart, especially for grades 5 and above. This can result in frustration and lack of motivation for students as they do not provide the flexibility to read a wide range of books. Just because a book is a classic does not mean it has a high readability level. For example, John Steinbeck's *The Grapes of Wrath* has both a low ATOS level (4.9) and a low Lexile level. While the book is still within the recommended reading range for high school students on the AR Goal-Setting Chart, it would not be in the range for high school students under the Lexile system. Table 4 (next page) shows a comparison of ZPD ranges and Lexile ranges.

In addition to using ZPD ranges, students should be guided to select books with an appropriate interest level. Interest levels refer to the sophistication and maturity level of a book's content, ideas, and themes, and are based onpublisher recommendations. Interest levels are divided into four categories: LG for lower grades (K–3), MG for middle grades (4–8), MG+ for more mature middle-grade readers, and UG for upper grades (9–12). For example, Steinbeck's *Of Mice and Men* has an upper-grade (UG), or high school, interest level, indicating the content is generally suitable for high school readers. Educators should use professional judgment to determine how an individual student may handle the ideas and content of a book with a higher interest level.

After students are familiar with both the ZPD ranges and interest levels appropriate for them, they may use Renaissance Learning's AR BookFinder to begin searching for books to read: **www.arbookfind.com**.

Table 4: ZPD Ranges Allow Students to Read a Wider Range of Literature

Grade Equivalent	ZPD Range		Lexile Range Converted to ATOS Scale for Comparison	
	Low	High	Low	High
5.0	3.4	5.4	3.8	6.4
5.5	3.7	5.7	4.0	6.8
6.0	4.0	6.1	4.3	7.4
6.5	4.2	6.5	4.6	8.0
7.0	4.3	7.0	4.9	8.5
7.5	4.4	7.5	5.0	8.7
8.0	4.5	8.0	5.2	9.1
9.0	4.6	9.0	5.8	10.1
10.0	4.7	10.0	6.3	10.9
11.0	4.8	11.0	6.6	11.3
12.0	4.9	12.0	6.9	11.7

Step 4: Continuous Monitoring

As explained earlier, there are appreciable degrees of error in both text readability measures and student reading achievement measures. In addition, students have different interests, challenges at home, appetites for challenge, and prior reading experiences. For example, a nonfiction book with an ATOS level of 7.0 may be too difficult for most students with a tested reading grade equivalent score of 6.0, but may be perfect for a student with a keen interest in the book's topic. The same student may struggle with a science fiction book with an ATOS level of 5.0 if he is not interested in or has never read this genre.

Educators should use readability formulas and reading tests to select appropriate reading ranges for students, but the process does not end there. Educators need to continuously monitor students to ensure they are reading with a high level of success. Research supports reading at a high level of comprehension (Allington, 1984; Betts, 1946; Rosenshine & Stevens, 1984). For students who struggle academically, high rates of success are especially critical and have a greater impact on achievement than additional engaged time on task (Marliave & Filby, 1985).

With Accelerated Reader, the level of success in reading practice is measured by percent correct on Accelerated Reader Reading Practice Quizzes. Renaissance Learning recommends students average 85 percent correct or higher on their quizzes (see Appendix A, p. 10), which has been validated by several large research studies. For example, Topping and Sanders (2000) analyzed Tennessee Value-Added Assessment System data and found a positive effect on the teacher effectiveness index when students averaged 85 percent correct or higher.

Researchers at Renaissance Learning also validated the 85 percent correct recommendation by analyzing the reading practice and achievement data of more than 50,000 students (Paul, 2003). This research showed that percent correct on AR Reading Practice Quizzes is more important to student reading achievement than the amount of reading or readability level of books. At all ability levels, students experience greater reading gains as percent correct increases (see Table 5).

Additional studies used hierarchical linear modeling to confirm and extend these findings. Borman and Dowling (2004) also found that a high average percent correct on AR quizzes over the course of the school year was associated with better reading achievement at the end of the school year. Bolt (2004) found the benefits of a high success rate on AR quizzes held regardless of the core reading curriculum used in the classroom.

Table 5: Students Experience Greater Normal Curve Equivalent (NCE) Gains as Percent Correct Increases
(Grades 2–12; n = 45,670)

Student Achievement Level (Percentile Range)	Average Percent Correct Range				
	Below 65%	65%–74%	75%–84%	85%–94%	95%–100%
0–20	–2.08	–0.74	1.57	5.01	3.44
21–40	–3.13	–1.18	0.85	4.72	6.35
41–60	–4.66	–1. 06	0.23	5.29	6.77
61–80	–3.95	–2.78	–0.30	3.21	6.08
81–100	–5.72	–4.78	–2.18	2.11	4.93

However, despite the strength of the evidence supporting a high comprehension rate, some reading programs, including The Lexile Framework, target a lower level of comprehension. For example, Lexile targets 75 percent comprehension with its book level recommendations. This benchmark is not supported by research and is described by the publisher as "an arbitrary, but useful, choice of 75% comprehension" (Stenner & Stone, 2004, p. 21).

While readability formulas and reading tests are important tools for educators to use to begin selecting reading ranges for and matching books to students, they are only a start. Truly, the most important step is to continuously monitor students' comprehension and ensure they are reading a wide variety of books at an appropriate level. Thoughtful and deliberate guidance is the key to creating students who love to read and are well read.

Conclusion

Matching books to students remains as much of an art as a science, which is why teachers and librarians are—and always have been—essential in the teaching of reading. No formula can take the place of a trained educator who knows her students. Readability formulas, reading tests, and reading ranges are, however, important tools. They give teachers and librarians a place to begin matching books to students. From there, daily monitoring of student reading behavior and comprehension gives educators more reliable information about reading achievement, which, in turn, helps to continually guide student reading practice and foster a love of reading. The ATOS for Books Readability Formula, designed especially to accurately level trade books, coupled with the AR Goal-Setting Chart and AR Best Practices for classroom implementation are a set of superior research-based tools to help educators successfully accomplish this task.

Appendix A: Accelerated Reader Goal-Setting Chart

Use Table A1 or the online **AR Goal Calculator: http://argoals.renlearn.com/** to help set reading practice goals for your students, based on their reading level and the amount of time you provide for practice.

1. **Identify ZPDs.** Identify each student's grade-equivalent score (GE) with a standardized assessment, such as STAR Reading, or estimate a GE based on a student's past performance. The corresponding ZPD is a recommended book-level range for the student. If books in that range seem too hard or easy for the student, choose a new range or create a wider one that better matches the student's abilities.

2. **Set the Average-Percent-Correct Goal.** The most important goal for all students is to average at least 85 percent on AR Reading Practice Quizzes. Averages of 90 percent and higher are associated with the greatest gains. If a student struggles to maintain this average, talk to the student and find out why. Then decide on a strategy that will lead to success.

3. **Set Point Goals.** The chart shows the number of points students are expected to earn based on GE and time spent reading. (Point goals for emergent readers are based on scaled scores from STAR Early Literacy.) These are estimates. Set goals that are realistic for individual students. Points earned by emergent readers will reflect time spent listening to books read aloud and reading with a partner, as well as some independent reading.

Table A1: Accelerated Reader Goal-Setting Chart

		60 Min. Daily Practice			35 Min. Daily Practice			30 Min. Daily Practice			20 Min. Daily Practice			15 Min. Daily Practice		
Grade-Equivalent Score	Suggested ZPD	Points per Week	Points per 6 Weeks	Points per 9 Weeks	Points per Week	Points per 6 Weeks	Points per 9 Weeks	Points per Week	Points per 6 Weeks	Points per 9 Weeks	Points per Week	Points per 6 Weeks	Points per 9 Weeks	Points per Week	Points per 6 Weeks	Points per 9 weeks
Emergent Reader		1.7	10	15	1.0	5.8	8.8	0.9	5.0	7.5	0.6	3.3	5.0	0.4	2.5	3.8
1.0	1.0-2.0	1.7	10	15	1.0	5.8	8.8	0.9	5.0	7.5	0.6	3.3	5.0	0.4	2.5	3.8
1.5	1.5-2.5	1.9	11	17	1.1	6.4	9.9	1.0	5.5	8.5	0.6	3.7	5.7	0.5	2.8	4.3
2.0	2.0-3.0	2.1	13	19	1.2	7.6	11.1	1.1	6.5	9.5	0.7	4.3	6.3	0.5	3.3	4.8
2.5	2.3-3.3	2.3	14	21	1.3	8.2	12.3	1.2	7.0	10.5	0.8	4.7	7.0	0.6	3.5	5.3
3.0	2.6-3.6	2.5	15	23	1.5	8.8	13.4	1.3	7.5	11.5	0.8	5.0	7.7	0.6	3.8	5.8
3.5	2.8-4.0	2.7	16	24	1.6	9.3	14.0	1.4	8.0	12.0	0.9	5.3	8.0	0.7	4.0	6.0
4.0	3.0-4.5	2.8	17	25	1.6	9.9	14.6	1.4	8.5	12.5	0.9	5.7	8.3	0.7	4.3	6.3
4.5	3.2-5.0	3.2	19	29	1.9	11.1	16.9	1.6	9.5	14.5	1.0	6.3	9.7	0.8	4.8	7.3
5.0	3.4-5.4	3.5	21	32	2.0	12.3	18.7	1.8	10.5	16.0	1.2	7.0	10.7	0.9	5.3	8.0
5.5	3.7-5.7	3.9	23	35	2.3	13.4	20.4	2.0	11.5	17.5	1.3	7.7	11.7	1.0	5.8	8.8
6.0	4.0-6.1	4.2	25	39	2.5	14.6	22.8	2.1	12.5	19.5	1.4	8.3	13.0	1.1	6.3	9.8
6.5	4.2-6.5	4.6	28	41	2.7	16.3	23.9	2.3	14.0	20.5	1.5	9.3	13.7	1.2	7.0	10.3
7.0	4.3-7.0	4.9	29	44	2.9	16.9	25.7	2.5	14.5	22.0	1.6	9.7	14.7	1.2	7.3	11.0
7.5	4.4-7.5	5.3	32	48	3.1	18.7	28.0	2.7	16.0	24.0	1.8	10.7	16.0	1.3	8.0	12.0
8.0	4.5-8.0	5.6	34	50	3.3	19.8	29.2	2.8	17.0	25.0	1.9	11.3	16.7	1.4	8.5	12.5
9.0	4.6-9.0	6.3	38	57	3.7	22.2	33.3	3.2	19.0	28.5	2.1	12.7	19.0	1.6	9.5	14.3
10.0	4.7-10.0	6.9	41	62	4.0	23.9	36.2	3.5	20.5	31.0	2.3	13.7	20.7	1.7	10.3	15.5
11.0	4.8-11.0	7.6	46	68	4.4	26.8	39.7	3.8	23.0	34.0	2.5	15.3	22.7	1.9	11.5	17.0
12.0	4.9-12.0	8.3	50	75	4.8	29.2	43.8	4.2	25.0	37.5	2.8	16.7	25.0	2.1	12.5	18.8

Appendix B: ATOS Conversion Charts

Table B1: Conversion of ATOS for Books to Reading Recovery and Guided Reading Scales

ATOS Book Level	Reading Recovery Level	Guided Reading Level*	Guided Reading Grade Level*
0.2 - 0.4	1	A	K
0.2 - 0.4	2	B	K
0.5 - 0.6	3	C	K/1
0.5 - 0.6	4	C	K/1
0.5 - 0.6	5	D	1
0.7 - 0.9	6	D	1
0.7 - 0.9	7	E	1
0.7 - 0.9	8	E	1
0.7 - 0.9	9	F	1
1.0 - 1.2	10	F	1
1.0 - 1.2	11	G	1
1.3 - 1.5	12	G	1
1.3 - 1.5	13	H	1
1.6 - 1.9	14	H	1
1.6 - 1.9	15	I	1
2.0 - 2.4	16	I	1
2.0 - 2.4	17	J	2
2.5 - 2.9	18	J	2
2.5 - 2.9	19	K	2
2.5 - 2.9	20	K	2
2.5 - 2.9	21	L	2
3.0 - 3.4	22	M	2
3.4 - 3.9		N	2/3
3.4 - 3.9		O	3/4
4.0 - 4.4		P	3/4
4.0 - 4.4		Q	4/5
4.5 - 4.9		R	4/5
4.5 - 4.9		S	5
5.0 - 5.4		T	5
5.0 - 5.4		U	5
5.5 - 5.9		V	6
6.0 - 6.9		W,X,Y,Z	6

** From the Fountas & Pinnell Guided Reading Leveling System*

Table B2: Conversion of ATOS for Books to 100-point, 2000-point, and Flesch-Kincaid Scales

ATOS Levels	ATOS 100-Point Scale Values	ATOS 2000-Point Scale Values	Flesch-Kincaid
0.1	10	15	0.0
0.2	17	19	0.0
0.3	21	23	0.2
0.4	24	27	0.3
0.5	27	31	0.4
0.6	29	35	0.5
0.7	30	39	0.6
0.8	32	43	0.7
0.9	33	47	0.8
1.0	34	51	0.9
1.1	35	71	1.1
1.2	36	92	1.2
1.3	37	120	1.3
1.4	38	140	1.4
1.5	38	157	1.5
1.6	39	170	1.6
1.7	40	190	1.7
1.8	40	202	1.8
1.9	41	221	2.0
2.0	41	241	2.1
2.1	42	261	2.2
2.2	42	289	2.3
2.3	43	301	2.4
2.4	43	329	2.5
2.5	44	348	2.6
2.6	44	361	2.7
2.7	44	381	2.9
2.8	45	401	3.0
2.9	45	420	3.1
3.0	46	440	3.2
3.1	46	459	3.3
3.2	46	479	3.4
3.3	47	491	3.5
3.4	47	511	3.6
3.5	47	530	3.8
3.6	47	549	3.9
3.7	48	561	4.0
3.8	48	580	4.1

Table B2: Conversion of ATOS for Books to 100-point, 2000-point, and Flesch-Kincaid Scales (continued)

ATOS Levels	ATOS 100-Point Scale Values	ATOS 2000-Point Scale Values	Flesch-Kincaid
3.9	48	600	4.2
4.0	49	619	4.3
4.1	49	631	4.4
4.2	49	650	4.5
4.3	50	669	4.7
4.4	50	681	4.8
4.5	50	701	4.9
4.6	51	720	5.0
4.7	51	731	5.1
4.8	51	750	5.2
4.9	52	769	5.3
5.0	52	781	5.4
5.1	52	800	5.6
5.2	52	811	5.7
5.3	53	829	5.8
5.4	53	841	5.9
5.5	53	860	6.0
5.6	54	870	6.1
5.7	54	888	6.2
5.8	54	899	6.3
5.9	55	910	6.5
6.0	55	921	7.0
6.1	55	931	7.2
6.2	56	941	7.3
6.3	56	951	7.4
6.4	56	969	7.6
6.5	57	979	7.7
6.6	57	989	7.8
6.7	57	999	8.0
6.8	57	1009	8.1
6.9	58	1019	8.2
7.0	58	1029	8.4
7.1	59	1040	8.5
7.2	60	1052	8.6
7.3	60	1061	8.7
7.4	60	1070	8.9
7.5	60	1080	9.0
7.6	60	1088	9.1

Table B2: Conversion of ATOS for Books to 100-point, 2000-point, and Flesch-Kincaid Scales (continued)

ATOS Levels	ATOS 100-Point Scale Values	ATOS 2000-Point Scale Values	Flesch-Kincaid
7.7	61	1098	9.3
7.8	61	1109	9.4
7.9	61	1117	9.5
8.0	61	1121	9.7
8.1	61	1130	9.8
8.2	62	1140	9.9
8.3	62	1149	10.1
8.4	62	1152	10.2
8.5	62	1161	10.3
8.6	62	1170	10.5
8.7	62	1178	10.6
8.8	63	1188	10.7
8.9	63	1192	10.8
9.0	63	1201	11.0
9.1	63	1211	11.1
9.2	63	1222	11.2
9.3	63	1237	11.4
9.4	64	1242	11.5
9.5	64	1258	11.6
9.6	64	1265	11.8
9.7	64	1272	11.9
9.8	64	1279	12.0
9.9	64	1286	12.2
10.0	65	1293	12.3
10.1	65	1300	12.4
10.2	65	1307	12.6
10.3	65	1314	12.7
10.4	65	1321	12.8
10.5	65	1328	12.9
10.6	65	1335	13.1
10.7	66	1342	13.2
10.8	66	1349	13.3
10.9	66	1356	13.5
11.0	66	1364	13.6
11.1	66	1371	13.7
11.2	66	1378	13.9
11.3	66	1385	14.0
11.4	67	1392	14.1

Table B2: Conversion of ATOS for Books to 100-point, 2000-point, and Flesch-Kincaid Scales (continued)

ATOS Levels	ATOS 100-Point Scale Values	ATOS 2000-Point Scale Values	Flesch-Kincaid
11.5	67	1399	14.3
11.6	67	1406	14.4
11.7	67	1413	14.5
11.8	67	1420	14.7
11.9	67	1427	14.8
12.0	67	1434	14.9
12.1	67	1441	15.0
12.2	68	1448	15.2
12.3	68	1455	15.3
12.4	68	1462	15.4
12.5	68	1469	15.6
12.6	68	1476	15.7
12.7	68	1483	15.8
12.8	68	1490	16.0
12.9	68	1497	16.1
13.0	69	1504	16.2
13.1		1511	
13.2		1518	
13.3		1525	
13.4		1532	
13.5		1539	
13.6		1547	
13.7		1554	
13.8		1561	
13.9		1568	
14.0		1575	
14.1		1582	
14.2		1589	
14.3		1596	
14.4		1603	
14.5		1610	
14.6		1617	
14.7		1624	
14.8		1631	
14.9		1638	
15.0		1645	

Table B2: Conversion of ATOS for Books to 100-point, 2000-point, and Flesch-Kincaid Scales (concluded)

ATOS Levels	ATOS 100-Point Scale Values	ATOS 2000-Point Scale Values	Flesch-Kincaid
15.1		1652	
15.2		1659	
15.3		1666	
15.4		1673	
15.5		1680	
15.6		1687	
15.7		1694	
15.8		1701	
15.9		1708	
16.0		1715	
16.1		1722	
16.2		1730	
16.3		1737	
16.4		1744	
16.5		1751	
16.6		1758	
16.7		1765	
16.8		1772	
16.9		1779	

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