

# What Works Clearinghouse



## Reading Apprenticeship<sup>®</sup>

**Program Description<sup>1</sup>** *Reading Apprenticeship*<sup>®</sup> is an instructional approach that intends to help middle school, high school, and community college students develop skills and knowledge to improve their engagement, fluency, and comprehension of content-area materials and texts. To achieve these goals, *Reading Apprenticeship*<sup>®</sup> provides a range of professional development activities for teachers, as well as an academic literacy curricula for students. In both cases, *Reading Apprenticeship*<sup>®</sup> calls for the teacher to assume the role of expert reader. In this role, the teacher models and guides students' text-based problem

solving in order to build students' comprehension strategies. By incorporating student/teacher discussions about the process of reading into content-area classes, *Reading Apprenticeship*<sup>®</sup> aims to make the teacher's and students' reading processes and knowledge visible to others in the classroom, help students understand and regulate their own reading processes, and help students develop strategies for overcoming obstacles while reading and for improving comprehension of texts from core academic disciplines.

**Research<sup>2</sup>** One study of *Reading Apprenticeship*<sup>®</sup> that falls within the scope of the Adolescent Literacy review protocol meets What Works Clearinghouse (WWC) evidence standards. The study included more than 2,000 ninth-grade students who attended 17 high schools located in 10 school districts across the United States.<sup>3</sup>

Based on this study, the WWC considers the extent of evidence for *Reading Apprenticeship*<sup>®</sup> on adolescent learners to be small for comprehension. No studies that meet WWC evidence standards with or without reservations examined the effectiveness of *Reading Apprenticeship*<sup>®</sup> on adolescent learners in the alphabetic, reading fluency, or general literacy achievement domains.

1. The descriptive information for this program was obtained from publicly available sources: the program's website (<http://www.wested.org/ReadingApprenticeship>, downloaded November 2009) and *Reading for understanding: A guide to improving reading in middle and high school classrooms* (Schoenbach, Greenleaf, Cziko, and Hurwitz, 1999). The WWC requests developers to review the program description sections for accuracy from their perspective. Further verification of the accuracy of the descriptive information for this program is beyond the scope of this review. The literature search reflects documents publicly available by April 2009.
2. The studies in this report were reviewed using WWC Evidence Standards, Version 2.0 (see the WWC Procedures and Standards Handbook, Chapter III), as described in protocol Version 2.0.
3. The evidence presented in this report is based on available research. Findings and conclusions may change as new research becomes available.

**Effectiveness** *Reading Apprenticeship*® was found to have potentially positive effects on comprehension for adolescent learners.

	<i>Alphabetics</i>	<i>Reading fluency</i>	<i>Comprehension</i>	<i>General literacy achievement</i>
<b>Rating of effectiveness</b>	na	na	Potentially positive effects	na
<b>Improvement index<sup>4</sup></b>	na	na	Average: +2 percentile points	na
	na	na	Range: -2 to +5 percentile points	na

na = not applicable

### Additional program information

#### Developer and contact

Developed by Strategic Literacy Initiative at WestEd, *Reading Apprenticeship*® is distributed by WestEd. Address: 300 Lakeside Drive, 25th Floor, Oakland, CA 94612-3534. Email: [jbouc@wested.org](mailto:jbouc@wested.org). Web: <http://www.wested.org/ReadingApprenticeship>. Telephone: (510) 302-4245.

#### Scope of use

Since 1996, the *Reading Apprenticeship*® approach has been used across a range of content areas in middle and high school classrooms. Since 2005, it also has been used in community college classrooms. *Reading Apprenticeship*® has been used with a wide range of students, including those identified as struggling readers, English language learners, special education students, and students in honors and advanced placement classes.

#### Teaching

The aim of *Reading Apprenticeship*® is to improve students' reading skills by having them learn how to closely examine both their own reading strategies and processes and those of their teacher and fellow students. The goal is for students to learn to recognize the strategies they have already been using and to develop new ones in a way that is directly related to content-area text they encounter in class. Small-group and full-classroom conversations about, and students' reflections on, the thinking process being used while reading are fundamental components of the program.

*Reading Apprenticeship*® calls for teachers to integrate four dimensions of classroom life into subject-area teaching through conversations about the thinking processes that students and teachers use as they read. Per the developer's website, these are the four dimensions:

*Social:* This dimension uses students' interests in social interaction to provide a learning environment that reflects the diverse perspectives and resources of each individual. It involves creating a safe, collaborative environment in which to discuss academic texts.

*Personal:* This dimension draws on skills used by students in out-of-school settings, students' interest in deepening their awareness of the thinking processes used while reading, students' identities as readers, and their purposes and goals for reading.

*Cognitive:* This dimension involves developing readers' mental processes, including the specific comprehension and problem-solving strategies that can be applied to academic texts.

*Knowledge-building:* This dimension includes identifying and expanding the knowledge readers bring to a text, including knowledge about word construction, vocabulary, text structure, genre, language, and content.

*Reading Apprenticeship*® staff and consultants provide professional development and train-the-trainer sessions for content-area middle and high school teachers, literacy coaches,

4. These numbers show the average and range of student-level improvement indices for all findings across the study.

## Additional program information *(continued)*

site-level administrators, and district leaders to help them incorporate *Reading Apprenticeship*® in classrooms, schools, and districts. Professional development involves participants examining their own and their colleagues' discipline-specific reading and students' reading and writing during training sessions and on-site meetings. WestEd also offers *The Leadership Institute in Reading Apprenticeship*®, a two-part, eight-day training institute designed to train teams of educators to lead professional development in *Reading Apprenticeship*®.

Additionally, the program developers offer a year-long curriculum for 9th-grade students. The *Reading Apprenticeship*® *Academic Literacy* curriculum is designed to support students' reading achievement, engagement, and fluency. The course—which is organized around three thematic units: (1) Reading Self and Society, (2) Reading History, and (3) Reading Science—is designed to build students' motivation, strategic and critical reading skills, and ability to construct meaning from academic texts. The course focuses students' attention on *how* they read (a metacognitive process) to help them better understand *what*

they read (understanding content). As part of the course, students read high-interest, challenging texts; analyze the way words and sentences are constructed; and use writing as a tool for learning.

### Cost

WestEd provides professional development and materials to support teachers' use of *Reading Apprenticeship*® in the classroom. These materials include books, videos, and a curriculum for a 9th-grade course called *Reading Apprenticeship*® *Academic Literacy*.

Standard costs for *Reading Apprenticeship*® training (for up to 40 participants) held at a district-selected location range from \$15,000 for two days of training up to \$50,000 for seven days of training. The cost to attend the *Reading Apprenticeship*® *Academic Literacy* five-day training for the 9th-grade course ranges from \$3,000 (site based) to \$3,200 (San Francisco) per participant.

Additional information on costs of training materials and workshops is available online (<http://www.wested.org/sli>).

## Research

Twenty-seven studies reviewed by the WWC investigated the effects of *Reading Apprenticeship*® on adolescent learners. One study (Kemple et al., 2008) is a randomized controlled trial that meets WWC evidence standards. The remaining 26 studies do not meet either WWC evidence standards or eligibility screens.

### Meets evidence standards

Kemple et al. (2008) conducted a randomized controlled trial that examined the effects of *Reading Apprenticeship*® on 9th-grade students attending 17 high schools from 10 school districts across the United States. Students reading two or more years below grade level were randomly assigned to be enrolled in *Reading Apprenticeship*® or to serve as the control group. The WWC based its effectiveness rating on findings from two cohorts of students who were reading at least two years below

grade level. Cohort 1 was formed in the 2005/06 school year and consisted of 686 ninth-grade students who received *Reading Apprenticeship*® and 454 ninth-grade students in the control group who did not receive *Reading Apprenticeship*®. Cohort 2 was formed in the 2006/07 school year and consisted of 645 ninth-grade students who received *Reading Apprenticeship*® and 470 ninth-grade students in the control group who did not receive *Reading Apprenticeship*®.<sup>5</sup> The study reported students' outcomes after 7.5 to 9 months of program implementation.

### Extent of evidence

The WWC categorizes the extent of evidence in each domain as small or medium to large (see the WWC Procedures and Standards Handbook, Appendix G). The extent of evidence takes into account the number of studies and the total sample size across

5. Findings for Cohort 2 ninth-grade students are reported in Corrin et al. (2008). See References section for more information.

## Research *(continued)*

the studies that meet WWC evidence standards with or without reservations.<sup>6</sup>

The WWC considers the extent of evidence for *Reading Apprenticeship*<sup>®</sup> to be small for the comprehension domain for

adolescent learners. No studies that meet WWC evidence standards with or without reservations examined the effectiveness of *Reading Apprenticeship*<sup>®</sup> on adolescent learners in the alphabets, reading fluency, or general literacy achievement domains.

## Effectiveness Findings

The WWC review of Adolescent Literacy interventions addresses student outcomes in four domains: alphabets, reading fluency, comprehension, and general literacy achievement. The study included in this report covers one domain, comprehension, which includes two constructs: reading comprehension and vocabulary development. The findings below present the authors' estimates and WWC-calculated estimates of the size and the statistical significance of the effects of *Reading Apprenticeship*<sup>®</sup> on adolescent learners.<sup>7</sup>

*Comprehension.* Kemple et al. (2008) did not find statistically significant effects of *Reading Apprenticeship*<sup>®</sup> on the reading comprehension and vocabulary subtests of the Group Reading Assessment and Diagnostic Evaluation (GRADE) for Cohort 1 students. For Cohort 2 students, the authors did not find statistically significant effects of *Reading Apprenticeship*<sup>®</sup> on the

GRADE vocabulary subtest, but found, and the WWC confirmed, a statistically significant positive effect of *Reading Apprenticeship*<sup>®</sup> on the GRADE reading comprehension subtest. Thus, for the comprehension domain, one study showed statistically significant positive effects of *Reading Apprenticeship*<sup>®</sup>.

### Rating of effectiveness

The WWC rates the effects of an intervention in a given outcome domain as positive, potentially positive, mixed, no discernible effects, potentially negative, or negative. The rating of effectiveness takes into account four factors: the quality of the research design, the statistical significance of the findings, the size of the difference between participants in the intervention and the comparison conditions, and the consistency in findings across studies (see the WWC Procedures and Standards Handbook, Appendix E).

## The WWC found *Reading Apprenticeship*<sup>®</sup> to have potentially positive effects on comprehension for adolescent learners

### Improvement index

The WWC computes an improvement index for each individual finding. In addition, within each outcome domain, the WWC computes an average improvement index for each study and an average improvement index across studies (see WWC Procedures and Standards Handbook, Appendix F). The improvement index represents the difference between the percentile rank of the average student in the intervention condition and the percentile rank of the average student in the comparison condition.

Unlike the rating of effectiveness, the improvement index is entirely based on the size of the effect, regardless of the statistical significance of the effect, the study design, or the analysis. The improvement index can take on values between -50 and +50, with positive numbers denoting favorable results for the intervention group.

The average improvement index for comprehension is +2 percentile points, with a range of -2 to +5 percentile points across findings from one study.

6. The extent of evidence categorization was developed to tell readers how much evidence was used to determine the intervention rating, focusing on the number and size of studies. Additional factors associated with a related concept—external validity, such as the students' demographics and the types of settings in which studies took place—are not taken into account for the categorization. Information about how the extent of evidence rating was determined for *Reading Apprenticeship*<sup>®</sup> is in Appendix A5.
7. The level of statistical significance was reported by the study authors or, when necessary, calculated by the WWC to correct for clustering within classrooms or schools and for multiple comparisons. For the formulas the WWC used to calculate the statistical significance, see WWC Procedures and Standards Handbook, Appendix C for clustering and WWC Procedures and Standards Handbook, Appendix D for multiple comparisons. In the case of Kemple et al. (2008), a correction for multiple comparisons was needed, so the significance levels may differ from those reported in the original study.

## Summary

The WWC reviewed 27 studies on *Reading Apprenticeship*<sup>®</sup> for adolescent learners.<sup>8</sup> One of these studies meets WWC evidence standards; the remaining 26 studies do not meet either

WWC evidence standards or eligibility screens. Based on one study, the WWC found potentially positive effects on comprehension for adolescent learners. The conclusions presented in this report may change as new research emerges.

## References

### Meets WWC evidence standards

Kemple, J. J., Corrin, W., Nelson, E., Salinger, T., Herrmann, S., & Drummond, K. (2008). *The Enhanced Reading Opportunities Study: Early impact and implementation findings* (NCEE report no. 2008-4015). Washington, DC: Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.

#### **Additional source:**

Corrin, W., Somers, M., Kemple, J. J., Nelson, E., & Sepanik, S. (2008). *The Enhanced Reading Opportunities Study: Findings from the second year of implementation* (NCEE report no. 2009-4036). Washington, DC: Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.

### Studies that fall outside the Adolescent Literacy review protocol or do not meet WWC evidence standards

Behrman, E. H. (2003). Literacy learning and the metaphor of apprenticeship. *College Reading Association Yearbook* (25), 128–143. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention, such as a meta-analysis or research literature review.

Chilla, N. (2006). *AYP gains for below-proficient readers in a top-ranking high school: Woodrow Wilson Senior High School, District of Columbia School System*. San Francisco, CA: WestEd. The study is ineligible for review because it does not use a comparison group.

Cziko, C. (1998). Reading happens in your mind, not in your mouth: Teaching and learning academic literacy in an urban

high school. *California English*, 3(4). The study is ineligible for review because it does not use a comparison group.

Deneroff, V. (2008). *Professional development in practice*. Paper presented at the NARST Annual International Conference: Impact of Science Education Research on Public Policy, Baltimore, MD. The study is ineligible for review because it does not use a comparison group.

Deshler, D. D., Palincsar, A. S., Biancarosa, G., & Nair, M. (2007). *Informed choices for struggling adolescent readers: A research-based guide to instructional programs and practices*. New York: Carnegie Corporation of New York. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention, such as a meta-analysis or research literature review.

Donohue, D. (2003). Reading across the great divide: English and math teachers apprentice one another as readers and disciplinary insiders. *Journal of Adolescent & Adult Literacy*, 47(1), 24–37. The study is ineligible for review because it does not include a student outcome.

Greenleaf, C., Brown, W., & Litman, C. (2004). Apprenticing urban youth to science literacy. In D. S. Strickland & D. E. Alvermann (Eds.), *Bridging the gap: Improving literacy learning for preadolescent and adolescent learners in grades 4–12* (pp. 200–226). Newark, NJ: International Reading Association. The study is ineligible for review because it does not use a comparison group.

Greenleaf, C., Hanson, T., Herman, J., Litman, C., Madden, S., Rosen, R., et al. (2009). *Integrating literacy and science instruction in high school biology: Impact on teacher practice*,

8. One single-case design study identified but not included in this review because the WWC did not have standards for reviewing single-case design studies.

## References

- student engagement, and student achievement*. Arlington, VA: National Science Foundation. The study does not meet WWC evidence standards because it is a randomized controlled trial in which the combination of overall and differential attrition rates exceeds WWC standards for this area, and the subsequent analytic intervention and comparison groups are not shown to be equivalent.
- Greenleaf, C., & Hinchman, K. (2009). Reimagining our inexperienced adolescent readers: From struggling, striving, marginalized, and reluctant to thriving. *Journal of Adolescent & Adult Literacy*, 53(1), 4–13. The study is ineligible for review because it does not use a comparison group.
- Greenleaf, C. L., & Mueller, F. L. (2003). *Impact of the pilot academic literacy course on ninth grade students' reading development: Academic year 1996–1997* (Report to the Stuart Foundations). San Francisco, CA: WestEd. The study is ineligible for review because it does not use a comparison group.
- Greenleaf, C. L., Schoenbach, R., Cziko, C., & Mueller, F. L. (2001). Apprenticing adolescent readers to academic literacy. *Harvard Educational Review*, 71(1), 159. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention, such as a meta-analysis or research literature review.
- Killion, J. (2002). *What works in the high school: Results-based staff development*. Oxford, OH: National Staff Development Council. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention, such as a meta-analysis or research literature review.
- Krebs, L. (2003). *Creating a Reading Apprenticeship classroom at Dixon High School*. Unpublished master's thesis in English pedagogy, California State University, Sacramento. The study is ineligible for review because it does not use a comparison group.
- Lewis, K., McColskey, W., Anderson, K., Bowling, T., Dufford-Melendez, K., & Wynn, L. (2007). *Evidence-based decision-making: Assessing reading across the curriculum interventions* (Issues & Answers Report, REL 2007-No.003). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Laboratory Southeast. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention, such as a meta-analysis or research literature review.
- Litman, C., & Greenleaf, C. (2008). Traveling together over difficult ground: Negotiating success with a profoundly inexperienced reader in an introduction to chemistry class. In K. Hinchman & H. Sheridan-Thomas (Eds.), *Best practices in adolescent literacy* (pp. 262–275). New York: Guilford Press. The study is ineligible for review because it does not use a comparison group.
- Mehdian, N. (2009). Teacher's role in the *Reading Apprenticeship* framework: Aid by the side or sage by the stage. *English Language Teaching*, 2(1), 3–12. The study is ineligible for review because it does not use a comparison group.
- Nield, R. C. (2009). Falling off track during the transition to high school: What we know and what can be done. *America's High Schools*, 19(1). The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention, such as a meta-analysis or research literature review.
- Sipe, K. L. (2006). *Reading Apprenticeship training: Implementation of reading instruction in secondary content-specific courses* (Doctoral dissertation, Immaculata College, 2006). *Dissertation Abstracts International*, 67(09A), 95–3348. The study is ineligible for review because it does not include a student outcome.
- Slavin, R. E., Cheung, A., Groff, C., & Lake, C. (2008). Effective reading programs for middle and high schools: A best-evidence synthesis. *Reading Research Quarterly*, 43(3), 290–322. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention, such as a meta-analysis or research literature review.
- Stanley, M. A. (2005). *An examination of the effects of the Reading Apprenticeship literacy framework on secondary science students' content knowledge and comprehension*.

## References

Unpublished master's thesis, California State University, San Marcos. The study is ineligible for review because it does not use a comparison group.

Thibodeau, G. M. (2008). A content literacy collaborative study group: High school teachers take charge of their professional learning. *Journal of Adolescent & Adult Literacy*, 52(1), 54–64. The study is ineligible for review because it does not use a comparison group.

WestEd. (2000). *1997–2000: A study of teacher learning and student reading outcomes in an SLI professional development network*. San Francisco, CA: Author. The study is ineligible for review because it does not use a comparison group.

WestEd. (2002). *Secondary school literacy project: A summary of student outcomes on the Degrees of Reading Power test, academic year 1999–2000*. San Francisco, CA: Author. The study does not meet WWC evidence standards because it uses a quasi-experimental design in which the analytic intervention and comparison groups are not shown to be equivalent.

WestEd. (2002). *1999–2002: Studies of student reading growth in diverse professional development networks*. San Francisco, CA: Author. The study is ineligible for review because it does not use a comparison group.

WestEd. (2004). *2001–2004: Increasing student achievement through school-wide Reading Apprenticeship*. San Francisco, CA: Author. The study is ineligible for review because it does not use a comparison group.

WestEd. (2004). *2001–2004: Reading Apprenticeship classroom study linking professional development for teachers to outcomes for students in diverse subject-area classrooms*. San Francisco, CA: Author. The study is ineligible for review because it does not use a comparison group.

## Studies with disposition pending

WestEd. (1999). *1996–1999 9th grade academic literacy course studies*. San Francisco, CA: Author. The study is not included because it uses a design for which the WWC is currently developing standards.

# Appendix

## Appendix A1 Study characteristics: Kemple et al., 2008

Characteristic	Description
<b>Study citation</b>	<p>Kemple, J. J., Corrin, W., Nelson, E., Salinger, T., Herrmann, S., &amp; Drummond, K. (2008). <i>The Enhanced Reading Opportunities study: Early impact and implementation findings</i> (NCEE 2008–4015). Washington, DC: Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.</p> <p><b>Additional source:</b> Corrin, W., Somers, M., Kemple, J. J., Nelson, E., &amp; Sepanik, S. (2008). <i>The Enhanced Reading Opportunities study: Findings from the second year of implementation</i> (NCEE report no. 2009–4036). Washington, DC: Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.</p>
<b>Participants</b>	<p>The study is a randomized controlled trial that used a two-stage random assignment design. First, 34 eligible schools were randomly assigned to implement one of two supplemental literacy programs: 17 schools were assigned to <i>Reading Apprenticeship</i><sup>®</sup> and 17 to <i>Xtreme Reading</i>.<sup>1</sup> Second, in each of the 17 schools assigned to <i>Reading Apprenticeship</i><sup>®</sup>, 9th-grade students were randomly assigned to <i>Reading Apprenticeship</i><sup>®</sup> or to the control group. Eligible students were defined as those who were reading at least two years below grade level. The study includes two cohorts of 9th-grade students: Cohort 1 was formed in the 2005/06 school year and consisted of 686 ninth-grade students who received <i>Reading Apprenticeship</i><sup>®</sup> and 454 ninth-grade students in the control group who did not. Cohort 2 was formed in the 2006/07 school year and consisted of 645 ninth-grade students who received <i>Reading Apprenticeship</i><sup>®</sup> and 470 ninth-grade students in the control group who did not. Overall and differential attrition rates of student attrition were low for Cohort 1 (30% and 6%, respectively) and Cohort 2 (36% and 3%, respectively).</p>
<b>Setting</b>	<p>The study was conducted in 17 schools located in 10 school districts across the United States.</p>
<b>Intervention</b>	<p>The intervention group received the <i>Reading Apprenticeship</i><sup>®</sup> <i>Academic Literacy</i> course as a supplemental intervention that replaced a 9th-grade elective class, rather than a core academic class. Therefore, students in the intervention group continued to attend their regular English language arts classes. <i>Reading Apprenticeship</i><sup>®</sup> <i>Academic Literacy</i> includes a detailed curriculum that is guided by the concept of “flexible fidelity” (i.e., teachers have flexibility in how they implement the curriculum in their day-to-day activities). Students attended <i>Reading Apprenticeship</i><sup>®</sup> classes for about 11 hours per month, on average. The study reported students’ outcomes after 7.5 to 9 months of program implementation.</p>
<b>Comparison</b>	<p>The control group received the standard instruction provided in the regular school curriculum and continued their participation in any regularly scheduled elective class (such as career/technical education, art, physical education, health, or foreign language).</p>
<b>Primary outcomes and measurement</b>	<p>For both the pretest and posttest, students took the reading comprehension subtest of the Group Reading Assessment and Diagnostic Evaluation (GRADE). For the posttest, students also took the GRADE vocabulary subtest. For a more detailed description of these outcome measures, see Appendix A2.</p>
<b>Staff/teacher training</b>	<p>Teachers took part in professional development activities prior to the start of the school year and on an ongoing basis throughout the school year. Training included one 5-day summer training institute as well as two 2-day booster sessions during the school year. They also received three 2-day coaching visits during the year and had access to a special online listserv.</p>

- Comparison between the *Xtreme Reading* group and the control group is outside the scope of this review. The study also presented impact findings for the subgroups of students defined by their baseline reading comprehension test scores, whether they were overage for the ninth grade, and whether a language other than English was spoken in their homes. These subgroup analyses were presented for the combined intervention group that included both literacy programs: *Xtreme Reading* and *Reading Apprenticeship*<sup>®</sup>. These findings are also outside the scope of this review because the measures of effectiveness cannot be attributed solely to *Reading Apprenticeship*<sup>®</sup>.



## Appendix A2 Outcome measures for the comprehension domain

Outcome measure	Description
<i>Reading comprehension construct</i>	
<b>Group Reading Assessment and Diagnostic Evaluation (GRADE): reading comprehension subtest</b>	GRADE is a norm-referenced reading assessment that can be used with students in pre-K through adulthood. The GRADE has four subtests: (1) vocabulary, (2) sentence comprehension, (3) passage comprehension, and (4) listening comprehension. The reading comprehension subtest score is a composite of the sentence comprehension and passage comprehension subtest scores (as cited in Kemple et al., 2008).
<i>Vocabulary development construct</i>	
<b>GRADE: vocabulary subtest</b>	GRADE is a norm-referenced reading assessment that can be used with students in pre-K through adulthood. The vocabulary subtest assesses students' decoding and vocabulary knowledge (as cited in Kemple et al., 2008).

## Appendix A3 Summary of study findings included in the rating for the comprehension domain<sup>1</sup>

Outcome measure	Study sample	Sample size (students)	Authors' findings from the study		WWC calculations			
			Mean outcome <sup>2</sup> (standard deviation) <sup>3</sup>		Mean difference <sup>4</sup> (Reading Apprenticeship <sup>®</sup> – comparison)	Effect size <sup>5</sup>	Statistical significance <sup>6</sup> (at $\alpha = 0.05$ )	Improvement index <sup>7</sup>
			Reading Apprenticeship <sup>®</sup> group	Comparison group				
<b>Kempe et al., 2008<sup>8</sup></b>								
GRADE: comprehension subtest	Grade 9, cohort 1	1140	89.88 (10.35)	88.94 (10.35)	0.94	0.09	ns	+4
GRADE: vocabulary subtest	Grade 9, cohort 1	1140	93.33 (10.18)	92.85 (10.19)	0.48	0.05	ns	+2
GRADE: comprehension subtest	Grade 9, cohort 2 <sup>9</sup>	1115	90.43 (10.02)	89.05 (10.11)	1.38	0.14	Statistically significant	+5
GRADE: vocabulary subtest	Grade 9, cohort 2 <sup>9</sup>	1115	93.59 (10.04)	94.02 (9.31)	-0.43	-0.04	ns	-2
<b>Domain average for comprehension (Kempe et al., 2008)<sup>10</sup></b>						<b>0.06</b>	<b>na</b>	<b>+2</b>

ns = not statistically significant

na = not applicable

GRADE = Group Reading Assessment and Diagnostic Evaluation

1. This appendix reports findings considered for the effectiveness rating and the average improvement indices for the comprehension domain.
2. The intervention group values are the comparison group means plus the regression-adjusted impacts presented in the study.
3. The standard deviation across all students in each group shows how dispersed the participants' outcomes are: a smaller standard deviation on a given measure would indicate that participants had more similar outcomes.
4. Positive differences and effect sizes favor the intervention group; negative differences and effect sizes favor the comparison group.
5. For an explanation of the effect size calculation, see WWC Procedures and Standards Handbook, Appendix B.
6. Statistical significance is the probability that the difference between groups is a result of chance rather than a real difference between the groups.
7. The improvement index represents the difference between the percentile rank of the average student in the intervention condition and that of the average student in the comparison condition. The improvement index can take on values between -50 and +50, with positive numbers denoting favorable results for the intervention group.
8. The level of statistical significance was reported by the study authors or, when necessary, calculated by the WWC to correct for clustering within classrooms or schools and for multiple comparisons. For the formulas the WWC used to calculate the statistical significance, see WWC Procedures and Standards Handbook, Appendix C for clustering and WWC Procedures and Standards Handbook, Appendix D for multiple comparisons. In the case of Kempe et al. (2008), a correction for multiple comparisons was needed, so the significance levels may differ from those reported in the original study.
9. Findings for Cohort 2 ninth-grade students are reported in Corrin et al. (2008). See References section for more information.
10. This row provides the study average, which in this instance is also the domain average. The WWC-computed domain average effect size is a simple average rounded to two decimal places. The domain improvement index is calculated from the average effect size.

## Appendix A4 Reading Apprenticeship® rating for the comprehension domain

The WWC rates an intervention's effects for a given outcome domain as positive, potentially positive, mixed, no discernible effects, potentially negative, or negative.<sup>1</sup>

For the outcome domain of comprehension, the WWC rated *Reading Apprenticeship*® as having potentially positive effects for adolescent learners. The remaining ratings (mixed, no discernible effects, potentially negative, or negative) were not considered, as *Reading Apprenticeship*® was assigned the highest applicable rating.

### Rating received

**Potentially positive effects:** Evidence of a positive effect with no overriding contrary evidence.

- Criterion 1: At least one study showing a statistically significant or substantively important *positive* effect.

**Met.** One study showed a statistically significant positive effect.

### AND

- Criterion 2: No studies showing a statistically significant or substantively important *negative* effect and fewer or the same number of studies showing *indeterminate* effects than showing statistically significant or substantively important *positive* effects.

**Met.** No study showed a statistically significant or substantively important negative effect or indeterminate effects.

### Other ratings considered

**Positive effects:** Strong evidence of a positive effect with no overriding contrary evidence.

- Criterion 1: Two or more studies showing statistically significant *positive* effects, at least one of which met WWC evidence standards for a *strong* design.

**Not met.** One study of *Reading Apprenticeship*® showed a statistically significant positive effect.

### AND

- Criterion 2: No studies showing statistically significant or substantively important *negative* effects.

**Met.** No study showed a statistically significant or substantively important negative effect.

1. For rating purposes, the WWC considers the statistical significance of individual outcomes and the domain-level effect. The WWC also considers the size of the domain-level effect for ratings of potentially positive or potentially negative effects. For a complete description, see the WWC Procedures and Standards Handbook, Appendix E.

## Appendix A5 Extent of evidence by domain

Outcome domain	Number of studies	Sample size		Extent of evidence <sup>1</sup>
		Schools	Students	
Alphabetics	0	na	na	na
Reading fluency	0	na	na	na
Comprehension	1	17	2255	Small
General literacy achievement	0	na	na	na

na = not applicable/not studied

1. A rating of “medium to large” requires at least two studies and two schools across studies in one domain and a total sample size across studies of at least 350 students or 14 classrooms. Otherwise, the rating is “small.” For more details on the extent of evidence categorization, see the WWC Procedures and Standards Handbook, Appendix G.