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EFFECTS OF THE “WRITE SOUNDS” PROGRAM ON
HANDWRITING AND PHONICS SKILLS

by

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A DISSERTATION

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EFFECTS OF THE “WRITE SOUNDS” INTERVENTION ON
HANDWRITING AND PHONICS SKILLS

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University of Nebraska, 2020

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Reading and writing rely on related foundational literacy skills (e.g., phonological processing, phonological memory, phonemic awareness; Brooks et al., 2011; Graham & Hebert, 2010, 2011; Sanders et al., 2018). Therefore, students struggling with reading often have writing problems, including handwriting (Kandel et al., 2017; Sanders, Berninger, & Abbott, 2018). It is often difficult to determine the source of writing difficulties as they could come from uncertainty in how to form the graphemes, poor spelling skills, or organizational deficits (Berninger et al., 2008). This study aimed to determine the usability, feasibility, and promise of an integrated handwriting intervention on 33 students struggling with handwriting and word-level reading or spelling difficulties in second- and third-grade. Researchers randomly assigned participants to receive the *Write Sounds* integrated handwriting intervention or a BAU control condition. Due to safety concerns surrounding the COVID-19 worldwide pandemic, all the participating schools closed, and the university suspended all in-person research. Therefore, the study ended abruptly, and the participants were unable to complete the intervention or posttest assessments as designed. The researchers used the *Write Sounds* Mastery Check 1 as a proxy for the posttests. At posttest, students who received the *Write Sounds* intervention ($n = 17$) significantly outperformed the control group ($n = 16$) on researcher-created measures of handwriting quality and overall legibility. The data presented should be

interpreted cautiously as the small sample size and adverse effects of the COVID-19 pandemic on the original study methodology may have impacted the results.

DEDICATION

This dissertation is dedicated to all my family and friends. I would not have been able to accomplish this without them. Especially my husband, Steve, and my children, Trent, Connor, and Haley for their unwavering support, encouragement, and love throughout this endeavor. I would not have been able to accomplish this without them.

I also dedicate this dissertation to my parents, George and Barb Shanahan, whose unconditional love and belief that I could accomplish anything will be with me always.

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CHAPTER 1

Introduction

Handwriting has historically been considered a skill that all children must master to succeed in school and beyond (Arslan, 2012; Harris et al., 1997; Sharp & Brown, 2015). *The Simple View of Writing* cognitive model includes handwriting as one of the foundational skills for writing (Berninger & Amtmann, 2003 & Berninger et al., 2010). Handwriting proficiency is a predictor of learning abilities in general and significantly correlates with academic achievement (Kushki et al., 2011). Moreover, students that do not possess foundational transcription skills (including handwriting) will often struggle with text generation (Berninger et al., 2002). Additionally, students may hesitate when writing. These hesitations could arise from uncertainty in forming the graphemes, or it could be a result of poor spelling skills (Berninger et al., 2008). Thus, it is difficult to ascertain the source of writing difficulty.

Writing disabilities affect many students and can occur in isolation or in addition to other language and reading disabilities (Katusic et al., 2009). One reading disability that often affects writing skills (i.e., handwriting, spelling, organization, text-generation), as well as reading skills is dyslexia. Dyslexia is a specific learning disability characterized by word-level reading difficulties (i.e., decoding, accurate word recognition, spelling), and it has a neurobiological origin (International Dyslexia Association [IDA], 2002; Lyon et al., 2003). Children with dyslexia or word-level reading difficulties often have problems with writing, including handwriting (Kandel et al., 2017; Sanders et al., 2018). It is not surprising for students with decoding difficulties to also struggle with writing tasks since reading and writing rely on related foundational

literacy skills (e.g., phonological processing, phonological memory, phonemic awareness; Brooks et al., 2011; Graham & Hebert, 2010, 2011; Sanders et al., 2018).

Why Children with Dyslexia May Have Difficulty with Writing

Students with dyslexia may experience writing difficulties in various ways. For example, they may have handwriting that is difficult to read, numerous spelling errors, and difficulty organizing their ideas (Hebert et al., 2018; Morken & Helland, 2013).

Writing proficiency (accurate and fluent writing) may be particularly challenging for students with dyslexia for three reasons.

First, students with dyslexia and word-level reading difficulties often have deficits in phonemic awareness (Berninger & O'Malley-May, 2011; Ehri, Nunes, Willows et al., 2001; Frost et al., 2009). These phonemic awareness deficits often lead to difficulty with connecting graphemes to corresponding phonemes (i.e., phonics). Instruction in the underlying skills of phonemic awareness improves reading and writing in typically developing and at-risk readers with learning disabilities (Ehri, Nunes, Willows et al. 2001; Sanders et al., 2017). Additionally, systematic phonics instruction is effective in increased decoding, word reading, text comprehension, and spelling in most students (Ehri, Nunes, Stahl et al., 2001).

Second, students with dyslexia often have difficulty efficiently and accurately forming graphemes, as well as connecting them with their corresponding phonemes (Bruck, 1992; Snowling, 1995). Students struggling to remember how to form letters or those that form letters inefficiently may fall behind in their writing skills. Also, difficulty linking these foundational handwriting and decoding skills often underlie secondary deficits in word decoding, reading fluency, comprehension, and writing skills, including

ideation, composition, and transcription for students with dyslexia (Hebert et al., 2018; Sanders et al., 2017).

Third, working memory is a system that can store information, support mental processes, and supply a link between short- and long-term memory (Baddeley, 2003). Working memory resources are necessary to support the underlying mental processes used while reading and writing (Berninger & Nagy, 2008; McCutchen, 1996). In Baddeley's (2003) working memory model, the phonological loop focuses on sound and language, whereas the visuospatial sketchpad focuses on visual representations of information. As stated in the previous two reasons, writing is difficult for children with dyslexia or word-level reading difficulties due to deficits in transcription and phonemic awareness skills.

These deficits in transcription skills (i.e., handwriting, spelling) and phonemic awareness may affect working memory functioning (Berninger, 1999; Berninger et al., 2010; Sumner et al., 2016). Students' difficulty with the orthographic or phonological systems taxes working memory. The more working memory is taxed, the more difficulty the students will have efficiently coordinating the "code" (Berninger & Wolf, 2009; Döhla & Heim, 2016; Frost et al., 2009). As a result, working memory at the word-level has been found to contribute to handwriting and composition deficits in second and fourth grade; and spelling in second-, fourth-, and sixth-grade (Berninger et al., 2010).

Integration of Literacy Skills to Support Students with Dyslexia

According to the shared knowledge theory, reading and writing draw on the same knowledge and cognitive systems (Ehri, 1987, 1997, 2005; Graham et al., 2017; Shanahan, 2016). Thus, teaching reading together with writing has reciprocal benefits

(Graham et al., 2017). Moreover, increasing a student's ability to access letter forms rapidly and efficiently may free up additional space in the working memory for more complicated literacy tasks.

Integration of one or more of the component skills (i.e., fluent letter formation, phonemic awareness, or working memory processing) necessary for fluent reading and writing may be difficult for students with dyslexia characteristics. A breakdown in the ability to integrate is a problem because the combination of these reading and writing skills is necessary to support the reciprocal relationships among them. A well-designed handwriting-phoneme-linked intervention could provide these students with repeated practice, contextual, and explicit instruction necessary to efficiently form graphemes and link them with their corresponding phonemes. Such a program would enable teachers to provide streamlined and integrated instruction focused on improving students with dyslexia and word-level reading difficulties' foundational handwriting, encoding, and decoding skills. With the idea that the right instruction could help build students' integration of reading and writing integration skills, I developed the *Write Sounds* intervention.

Development of the *Write Sounds* Intervention

Based on reasons for students' writing difficulties and prior research on effective instruction, it was important that the *Write Sounds* intervention be designed to include theoretically- and empirically-based instructional components. First, it was important to include explicit instruction in grapheme (i.e., a letter or letters representing a single speech sound) formation. One component of explicit instruction is breaking down larger, more complex tasks into smaller sequential chunks of instruction that build on each other,

thus making the skills more manageable for the learner (Archer & Hughes, 2011; Hughes et al., 2017). Therefore, the instruction needed to include sequential direct instruction of the specific stroke sequences required in the formation of each grapheme using visual and auditory cues in sections. Another component of explicit instruction is purposeful repeated practice to increase proficiency (Archer & Hughes, 2011; Hughes et al., 2017). Explicit instruction in stroke development and multiple opportunities for repeated practice promotes proficiency, and should reduce working memory load.

Second, the intervention needed to strengthen the students' grapheme-phoneme (i.e., smallest unit of a speech sound) correspondence. This is incorporated with repeated practice forming the grapheme while verbalizing the associated phoneme. Instruction in the underlying skills necessary for reading and writing (i.e., phonemic awareness, letter knowledge, letter-sound correspondence) can provide reciprocal benefits (Ehri, 2005; Graham et al., 2017).

Third, it was critical that the intervention incorporated contextual repeated practice in segmenting phonemes to spell dictated words, phrases, and sentences. This practice component strengthened the connection between the two foundational literacy skills of decoding (applying letter-sound relationships in order to read unknown words) and encoding (applying letter-sound relationships to spell/write unknown words). According to Share's (2004) "self-teaching" hypothesis, the ability to translate unknown printed words into their corresponding spoken form is the primary means of acquiring orthographic representations. The self-teaching model proposes that each successful identification of a new word is assumed to provide an opportunity to acquire the word-specific orthographic information that is the foundation of skilled visual word

recognition. Thus, it was also important to incorporate letter by letter decoding practice that is assumed to be critical for the formation of accurate orthographic representation by focusing attention on the order of letters and sounds into the intervention.

Fourth, it was important to also include a fluency training component with a focus on speed and accuracy (i.e., automaticity). Frequent practice in manageable chunks leads to automaticity (Kubina & Morrison, 2000; Logan, 1997). As a student increases handwriting automaticity, the speed also increases (Logan, 1997).

Based on effective intervention research identified by What Works Clearinghouse (Shanahan-Bazis et al., under review); I also felt it was beneficial to include error correction, self-monitoring, motivational techniques, and assessment. Finally, according to prior research, handwriting instruction for short sessions multiple times per week was more effective than longer, less frequent sessions (Graham et al., 2000). Therefore, I designed the *Write Sounds* intervention to be implemented four times a week with each lesson completed in a 15-min time frame. Detailed description of the instructional components is provided in the next section.

Description of the *Write Sounds* Intervention

The *Write Sounds* intervention was designed for small group instruction (two – four students) and includes 27 lessons with an alternating instructional sequence over nine weeks. A new learning lesson, using a foundation of explicit instruction, is immediately followed by a lesson focused on cumulative repeated practice and fluency (see Table 1).

Table 1*Description of Write Sounds Lesson Components*

New Learning Lessons	Cumulative Lessons
1) Explicit Letter Stroke Instruction	1) Review Previous Letter Stroke Instruction
2) Guided Letter-Sound Practice	2) Independent Letter-Sound Practice
3) Independent Letter-Sound Practice	3) Dictated Random Letter-Sound Practice
4) Dictated Random Letter-Sound Practice	4) Letter-Sound Transfer (contextual practice)
5) Letter-Sound Transfer (contextual practice)	5) Fluency Training (two-min timed practice)

Program Scope

The *Write Sounds* intervention follows an instructional sequence created to maintain a balance between the level of difficulty in letter formation strokes and articulation of the corresponding phoneme. The high-frequency words used for the contextual portion of the lessons were selected from The Basic Spelling Vocabulary List (Graham et al., 1993). These high-frequency words are aligned with the featured letter-sound correspondences for the dictation portion of the lesson. The dictation portion of the lessons includes phrases and sentences explicitly chosen to incorporate the grapheme-phoneme correspondences taught up to each lesson (see Appendix C).

Instructional Sequence

The first step of this intervention includes an explicit instruction component directly teaching the letter formation sequence using visual cues while simultaneously verbalizing the corresponding phoneme. The second step strengthens the letter and sound correspondence with repeated practice forming the letter while verbalizing the letter sound. The third step is contextual practice blending and unblending the letters and sounds to spell dictated words, phrases, and sentences. The sequence repeats for each

new grapheme with each lesson building upon the previous lessons with repeated practice. The primary objective is to help teach the students to write all letters of the alphabet accurately and automatically while identifying and verbalizing the corresponding phonemes. A secondary objective is to increase the students' ability to decode and spell phonetically regular words.

Also, students have two opportunities to self-assess during the lesson. First, when the student completes the repeated independent practice component, they circle the letter(s) with correct formation and verbalize their reasoning in the selection of that letter. Second, after writing the dictated words independently, the student circles the word(s) with correct letter formation and spelling, and then verbalizes their reasoning for the selection. Thus, they demonstrate their ability to self-assess. For reinforcement, students earn "musical notes" for each correctly formed letter or word, which they color until their reward chart is full.

The final activity of each lesson is fluency training. During fluency training, each student writes the phrase or sentence from the lesson as quickly and accurately as possible for two min. When the time is up, the teacher and student calculate the number of correct letters written per min and graph them to demonstrate progress.

The *Write Sounds* intervention organizes the instructional activities within a teacher manual and student response book. The teacher manual includes detailed information on explicit instruction for letter formation, including stroke verbiage, and all dictated stimuli (see Appendix C). Each lesson is soft scripted, and visuals provide additional support for the teacher and student. The student lesson book aligns with the

teacher manual with visual supports and stroke verbiage for each grapheme as well as dedicated space for handwriting (see Appendix C).

Support of Efficacy of the Write Sounds Intervention

I conducted an exploratory pilot study to collect anecdotal information regarding the feasibility & usability of the lesson components, instructional materials format, and overall instructional sequence of the *Write Sounds* intervention. Participants included two 3rd-grade and one 4th-grade student. Prior to selection for participation in the pilot study, these students demonstrated a need for handwriting instruction while attending a university-based reading center with programming designed for students at least one full year behind their peers in reading. The study included the first four, 15-min lessons as directed in the *Write Sounds* teacher manual. The students participated in the intervention in a small group setting, two days per week, for two weeks. I collected observational data during each session regarding the lesson's instructional sequence, instructional materials format, and feasibility of the lesson components. The findings noted in the observational data are as followed.

- 1) Students completed each lesson within the 15-min time frame.
- 2) The instructional sequence of each lesson flowed smoothly with quick student transitions between activities.
- 3) Successful completion of each lesson as written, demonstrating that the components built upon each other, providing a scaffold for new learning as designed.
- 4) Several issues with the formatting of instructional materials became apparent during the study.

The observational findings informed revisions to the program that were completed prior to the current study (see Table 2). In addition to the observational data, each participant verbally responded to the following open-ended questions:

- 1) What do you think about the program so far?
- 2) What would you change?

Table 2
Write Sounds Pilot Study Revisions and Rationale

	Intervention Component Added/Revised	Rationale
Teacher Manual		
	Add a lesson that explicitly teaches handwriting mechanics (e.g., pencil grip, paper placement).	Handwriting mechanics are a crucial component to handwriting accuracy and fluency; therefore need to be addressed.
	Add an intervention overview.	Students need to understand the lesson structure and expectations.
	Include a more complete script on the first four lessons for teacher support. The support will fade out by lesson five.	The soft script included was insufficient to explicitly teach without background knowledge in the intervention.
Student Manual		
	Example letters are slanted in the tracing sections. These need to be changed to match the letter formation verbiage.	The slanted letters did not follow the letter formation verbiage and confused the students.
	Make sure the model letters are consistent to the stroke directions (some letters don't quite touch the lines they are supposed to touch).	The students pointed out that the letters for tracing and modeling were not touching the lines exactly as the stroke verbiage stated and that was confusing for them.
Supplemental Materials		
	Add student motivation/progress monitoring tools (i.e., correct letter formation chart, fluency graph).	Because target students will likely be reluctant writers, a motivational component may be powerful. Also, this is one of the components found in effective interventions (Shanahan-Bazis et al., under review).

Some of the students' comments included:

"I really like it the way it is!"

"This is fun!" and

"It would be cool if we could do cursive instead of print."

Overall, the instructional sequence seemed appropriate for the students (i.e., grapheme introduction procedures, tracing a model, independent repeated practice, extended practice in context of words and sentences). Each student successfully completed the tasks required in each lesson with adequate support and reported that they enjoyed the lessons. There was evidence to support the feasibility of completing all of the lesson components within a 15-min time frame with quick transitions between activities, while seemingly facilitating student engagement.

Purpose and Research Questions

The purpose of the current study was to evaluate the usability, feasibility, and promise of the *Write Sounds* intervention in an elementary school setting for students with word-level reading or writing difficulties. The following research questions addressed the goals of the study.

Research question one addressed the usability and feasibility of the intervention in schools, based on fidelity, dosage, and teacher feedback. Research questions two and three addressed the *promise* of the intervention for impacting student proximal handwriting and spelling outcomes. In the original study design, I had a research question that addressed a distal outcome of decoding skills. Due to the COVID-19 pandemic, I was not able to administer the distal measures in decoding at posttest and therefore decided to remove the research question. The focus of questions two and three was on

promise, rather than efficacy, as the study was intentionally underpowered due to resource constraints. Thus, the promise of the program was assessed by examining underpowered effect sizes.

- 1) To what extent is the *Write Sounds* intervention usable, and is it feasible for classroom teachers to implement in an elementary school setting?
 - a) What are teachers' perspectives on the materials?
 - b) How well can the intervention be implemented within the allotted time frame (as measured by fidelity and dosage)?
- 2) What is the promise of the *Write Sounds* intervention to improve students' handwriting skills compared to those in the business-as-usual (BAU) condition?
- 3) What is the promise of the *Write Sounds* intervention to improve students' spelling skills, compared to those in the BAU condition?

CHAPTER 2

Literature Review

Handwriting instruction has been the focus of numerous experimental studies beginning in the early 1900s and continues today. The purpose of the current study is to evaluate the utility and promise of the *Write Sounds* integrated handwriting intervention. Therefore, to explain how the current study builds upon and extends previous studies conducted with students identified as struggling writers, I reviewed and summarized selected handwriting-focused studies. I grouped the studies by outcomes (i.e., handwriting quality, spelling, decoding, and compositional fluency). After the individual review of each study, I provide a summary of all the studies in the group and conclude with a review of how the *Write Sounds* intervention compares or contrasts to the key findings from those studies.

Impacts on Handwriting and Compositional Fluency

Students in the early grades may have difficulty expressing their thoughts through writing when their handwriting skills are not automatic (Berninger, 1999; Graham et al., 2000). Also, students with dysfluent or illegible handwriting may have delays in their writing development (Santangelo & Graham, 2016). Effective handwriting interventions may help students develop handwriting accuracy and fluency (Graham et al., 2000). Based on these findings, the current study proposed that an integrated intervention with explicit handwriting instruction, repeated practice, and fluency training may increase students' handwriting automaticity. The following group of studies specifically examines the effects of handwriting instruction on writing skills.

Berninger et al. (1997)

Berninger and colleagues investigated the potential impacts of handwriting instruction on handwriting outcomes and compositional fluency. The study included 144 first grade students with handwriting difficulties, each assigned to one of five treatment conditions or the control condition:

Group 1: Students write the letter after seeing the instructor write it (modeled).

Group 2: Students write the letter after examining a copy of it containing numbered arrows showing the order and direction for each stroke.

Group 3: Students write the letter from memory after examining an unmarked copy of the letter.

Group 4: Students write the letter from memory after examining a copy containing numbered arrows.

Group 5: Students write the letter while looking at an unmarked copy

Group 6 (control): Students received phonemic awareness instruction that included identifying, segmenting, deleting, and substituting syllables and sounds in words.

The groups met three days per week, for a total of 24 sessions. Each session lasted for 20 min, with the first 10 min varying depending on the group assigned, and the second 10 min all students composed and shared their writing. The study measured the effectiveness of each intervention with multiple measures: (a) an alphabet task (accuracy in 60 s), (b) a text copy task (words correct; letters correct; quality), (c) a timed copy task (accuracy in 60 s; quality), (d) a dictation task (accuracy), and (e) a writing fluency subtest (i.e., compositional fluency).

Researchers found that participants in the handwriting treatment groups made statistically significantly larger handwriting gains than participants in the phonemic awareness control group. Participants in Group 4 (i.e., letter writing after examining copy with arrows) were the most successful, with higher scores on the writing fluency subtest. Moreover, combining numbered arrows and memory retrieval was the most effective treatment for improving handwriting and compositional fluency. This finding is noteworthy because it shows transfer from direct instruction that implements visual cues for letter formation sequences in handwriting to compositional fluency.

Graham et al. (2000)

Graham and colleagues examined the impact of supplementary handwriting instruction on the handwriting and writing performance of first-grade students who were experiencing difficulty learning to write. The study included 38 first-grade students with and without learning disabilities. The researchers randomly assigned the students to one of two treatment conditions, handwriting, and phonological awareness instruction:

Group 1: Handwriting instruction consisted of letter formation (i.e., sets of three letters, grouped by common formation characteristics), alphabet warm-up (i.e., sequence and identification), self-monitoring/goal setting, and a fun alphabet related activity.

Group 2 (control): Phonological awareness instruction consisted of a daily message read together, the letter sound of the day, sound play (syllables, phonemes, unblending), rhyming, and sound songs. Both groups of students participated in 15-min lessons, three times a week for a total of 27 sessions.

Assessments included five measures of writing performance (a) an alphabet fluency task (number of letters correctly written in 15 s and total number of letters written during the full task), (b) a paragraph copying task (number of letters correctly copied in one and a half min), (c) a letter knowledge task (52 total letters), (d) a writing fluency task, and (e) a story writing. The researchers recorded the amount of time to complete the task. They also scored the writing for compositional fluency and compositional quality using a holistic 9-point scale.

The researchers found that Group 1 (direct handwriting instruction) had a more pronounced effect on all measures of handwriting performance at posttest than did the group who received instruction in phonological awareness. They found a statistically significant main effect for alphabet production, total number of alphabet letters written, and total number of letters copied. Moreover, the direct handwriting instruction group also had more significant gains in compositional fluency. However, after adjusting for pretest differences, the direct handwriting instruction group did not statistically outperform the phonological awareness group in story quality. Overall the students who received direct handwriting instruction outperformed their peers in the control condition. This study provided support for the use of direct handwriting instruction and self-monitoring.

Case-Smith et al. (2014)

Case-Smith and colleagues examined the effects of an embedded handwriting and writing program on handwriting and writing fluency for first-grade students. The study included 67 first-grade students from a Midwestern U.S. city. Researchers randomly assigned the participants to one of two conditions:

Group 1: The Write Start intervention condition consisted of twenty-four 45-min sessions implemented two times per week for 12 weeks. A co-teaching team (two teachers and one occupational therapist) taught all 26 lower case manuscript letters in a developmental sequence. The Write Start program core elements included modeled letter formation with verbal and visual cues, small groups (6-7 students) of station activities (motor planning, visual-motor integration, & cognitive learning), handwriting practice with teacher feedback, peer modeling & feedback, and formative & summative assessment.

Group 2 (control): This condition consisted of standard handwriting instruction four days per week for about 20 min. Teachers introduced one or two letters during “handwriting” and then referred to those letters later in the day when writing words and sentences. Students also completed brief writing assignments almost daily. Overall, the control condition received more handwriting/writing instruction time than the treatment condition.

Researchers implemented multiple measures to evaluate students’ progress: (a) handwriting legibility and fluency evaluation, (b) writing fluency (students compose sentences from three words written beside a picture), and (c) writing samples (students write a meaningful sentence for a given picture).

Students in the treatment condition statistically significant improvements on lowercase handwriting legibility, as well as, writing fluency. Students in the Write Start group completed an average of 3.3 more sentences, compared to 1.6 by the control group. There were also gains in handwriting speed, average legibility, and written expression,

although they were not statistically significant. This study illustrates the importance of visual cues and feedback.

Graham et al. (1997)

Graham and colleagues examined handwriting fluency (automatic & quick) to determine effects on higher-level aspects of compositional fluency. Participants included 300 primary students and 300 intermediate students from urban and suburban schools. This study was designed as a one-group assessment study.

Group 1: Researchers administered multiple assessments to each participant. The researchers administered multiple measures in the study: (a) reading-related skills of word attack, word ID and passage comprehension, (b) two handwriting measures consisting of an alphabet writing and copying task, (c) spelling measures including words in isolation and context, and (d) composition measures consisting of narrative and expository text.

A trained researcher scored all the assessments and a second scorer verified the scores to increase reliability. The researchers found that handwriting fluency directly contributed to compositional fluency and quality in both the primary and intermediate grades. These findings support the hypothesis that handwriting fluency is related to writing skills.

Berninger et al. (2006, study 1)

In this article, Berninger and colleagues evaluated whether training in orthographic and motor skills before direct instruction in letter formation is more effective than direct instruction in letter formation alone. Participants included 14 children who were struggling with handwriting legibility. Researchers randomly assigned

students to one of two treatment groups: neurodevelopmental (orthographic and motor skills) plus handwriting or only handwriting.

Group 1: The neurodevelopmental plus handwriting treatment was implemented one-on-one in ten sessions. The neurodevelopmental pre-treatment consisted of five sessions, which included orthographic coding activities (i.e., high-frequency words on cards and compared visually to the next card) and motor activities (i.e., squeezing putty, kinesthetic awareness, mazes, tying bows). Following pre-treatment activities, the researchers conducted five sessions of direct handwriting instruction using visual cues and verbal mediation. This segment of the treatment was the same as the direct handwriting instruction treatment condition.

Group 2 (control): Researchers implemented the “direct handwriting instruction only” portion of the treatment group for ten sessions. Each session included visual modeling with numbered arrow cues and letter copying tasks. Additionally, students verbalized the motor sequence as they wrote each letter.

Researchers assessed students’ progress through multiple measures: (a) letter writing accuracy (from memory and copying), letter writing speed (from memory and copying), and verbal mediation (i.e., self-talk to explain letter formation steps) probes, (b) the finger succession timed task (sequences of thumb-finger touches), (c) an orthographic coding task (determined if word shown matched the previously shown word), (d) writing samples (scored for quality, no penalty for spelling or punctuation errors), (e) writing fluency (sentence structure), and (f) vocabulary and block intelligence task.

The researchers found that Group 1 (neurodevelopment training) outperformed Group 2 (handwriting only, control) on the measures of accuracy of letter formation from memory, verbal mediation, whereas Group 2 outperformed Group 1 on measures of speed of writing the alphabet from memory, speed of copying text, and Woodcock Johnson-Revised Writing Fluency. This study shows that visual cues and verbalizing the strokes had an effect on handwriting fluency with additional opportunities for practice. Also, the use of orthographic coding and motor skill practice had a positive effect on handwriting accuracy.

Summary of Compositional Fluency Outcome Studies

There are several key findings from the studies discussed in this section that relate to the *Write Sounds* intervention. First, direct handwriting instruction contributed positively to writing fluency and confirms the need for direct handwriting instruction as part of the literacy curriculum. Also, in each study, the researchers implemented handwriting instruction at least three days per week for relatively short sessions. I have included each of these elements as part of the *Write Sounds* intervention. Second, visual cues to model handwriting strokes and letter formation had a positive effect on students' handwriting accuracy, fluency, and compositional fluency. It is important to note that the *Write Sounds* intervention incorporates visual cues in the instructional sequence of each new letter introduction. Third, when the control groups were provided phonological awareness instruction, the direct handwriting instruction group outperformed the phonological awareness group on the writing outcome measures. Therefore, it appears that phonological awareness instruction in isolation does not transfer to compositional fluency. This finding may support the integrated component of direct handwriting

instruction with phonological awareness. Therefore, *Write Sounds* includes direct handwriting instruction in addition to integrated phonemic awareness in each letter introduction sequence. The inclusion of both components may have positive effects on writing quality as well as handwriting skills. Because phonemic awareness is an underlying skill needed for spelling and decoding, those skills could transfer to spelling and decoding skills. In the next section, I review several studies that implement direct handwriting instruction to examine the effects on word reading skills.

Writing Instruction Impacts on Word Reading

Various types of writing instruction (i.e., process writing, text structure, paragraph/sentence instruction, sentence construction, and spelling) have been found to enhance students' overall reading (Graham & Hebert, 2010, 2011). Previous studies provided evidence that the underlying skills are the same for reading and writing and that reading and writing are reciprocal processes (Ehri, 1987, 1997, 2005; Graham & Hebert, 2011; Graham et al., 2017; Shanahan, 2016). In the current study, I hypothesized that by increasing handwriting proficiency, students' decoding skills will also increase. The following group of studies specifically examined the effects of handwriting instruction on word-level reading skills.

Berninger et al. (2006, study 2)

This manuscript described four studies, the second of which is relevant to this section. In the second study, the researchers examined whether motor training or orthographic training offered an advantage in students' writing as well as whether teaching handwriting transfers to word reading skills. Participants for this study included

20 first-grade students who were struggling with handwriting. Researchers randomly assigned participants to one of two treatment groups:

Group 1: Received motor training plus letter writing training for 12 one-hour lessons. Each lesson began with activities that involved reproducing (tracing, copying, writing) letters in addition to letter- and word-level handwriting lessons.

Group 2: Received orthographic coding training plus letter writing training for 12 one-hour lessons. Each lesson began with activities in coding (identifying and touching) letter forms but not reproducing (tracing, copying, writing) them in addition to letter-level and word-level handwriting lessons.

Researchers implemented multiple measures to assess student progress: (a) letter writing accuracy (from memory and copying), letter writing speed (from memory and copying), and verbal mediation (i.e., self-talk to explain letter formation steps) probes, (b) the finger succession timed task (sequences of thumb-finger touches), (c) an orthographic coding task (determined if word shown matched the previously shown word), (d) writing samples (scored for quality, no penalty for spelling or punctuation errors), (e) writing fluency (sentence structure), and (f) vocabulary and block intelligence task.

The researchers found that both treatments improved handwriting over time. However, neither motor training nor orthographic training alone added value to direct instruction in automatic letter writing and composing practice in developing handwriting skills. Both treatments also led to improved word reading. This study provided additional evidence of the importance of direct handwriting instruction at the letter-level, as both groups included this component. This study also supports the hypothesis that direct

handwriting instruction combined with letter identification activities improved word-level reading.

Berninger et al. (2006, study 3)

This manuscript described four studies, the third of which is relevant to this section. The goal of the third study was to examine the possible connection between word reading and handwriting in students with word-level reading difficulties. Participants included 13 first-grade students that were struggling with learning to read and decode words. In this study, researchers randomly assigned the students to one of two treatment conditions, decoding plus handwriting or decoding only. Both treatment conditions included phonological awareness, letter-sound correspondence work (instruction and review), practice decoding pseudo-words, and reading leveled texts.

Group One: Received decoding plus handwriting instruction. The decoding instruction included phonological awareness, letter-sound correspondence instruction and review, practice decoding pseudo-words, and practice reading leveled-text. The handwriting instruction component included opportunities for each student to write the corresponding letter(s) for a dictated sound.

Group Two (control): Received the same decoding instruction as group one.

Instead of handwriting instruction the students played finger games that were not related to letter-sound correspondence.

Researchers included multiple measures to assess student growth including (a) letter naming (all 26 letters), (b) rapid automatic naming of letters, (c) phonemes & rimes, (d) alphabet writing, (e) sentence copying task, (f) paragraph copying task, (g)

word reading, (h) pseudo-word reading, (i) reading comprehension, and (j) verbal comprehension.

Results indicated that Group 2 (decoding only treatment, control) was more effective for improving word reading, decoding, and letter writing from memory, whereas the Group 1 (decoding plus handwriting) was more effective in improving letter naming and letter writing from a model. This study provided evidence that incorporating handwriting within reading instruction did not improve reading outcomes, whereas the previous study found opposite results.

Summary of word reading outcome studies. There are two key findings in the studies discussed in this section that relate to the *Write Sounds* intervention. First, direct handwriting instruction continued to contribute positively to writing fluency, providing additional support for direct handwriting instruction as part of the literacy curriculum. Second, these studies resulted in inconsistent findings for word-level reading outcomes. Word-level reading improved when handwriting interventions included letter-sound correspondences. However, when handwriting instruction was included within decoding instruction, student outcomes were not significant. As stated previously, I have included an integrated component of phonemic awareness as well as letter-sound correspondence practice from memory in the *Write Sounds* intervention. I hypothesize that these additional components may contribute positively to word-level reading. Next, several studies that implement direct handwriting instruction are reviewed in order to examine the effects on spelling skills.

Instructional Impacts on Spelling (and Word Reading)

A recent meta-analysis found that formal spelling instruction (i.e., practicing writing spelling words, skill-specific teaching, multicomponent spelling) produced greater spelling gains than acquiring spelling skills through reading and writing (Graham & Santangelo, 2014). However, direct handwriting instruction was not included as a condition in the studies. The next set of studies examines the effects of explicit handwriting instruction on students' spelling (and word reading) outcomes.

Lavoie et al. (2019)

Lavoie and colleagues examine the effects of an explicit multicomponent alphabet writing instruction program on the handwriting (proximal) and spelling (distal) outcomes of first-grade students when instructed by the classroom teacher (whole group). The study included 80 French-speaking students and their teachers from 14 first grade classrooms. Researchers matched students based on a first name writing fluency task and then randomly assigned them to either the experimental or control group.

Group One: Implemented a multicomponent alphabet writing instruction program that included multisensory letter exploration, visual modeling, verbal modeling, kinesthetic modeling, self-verbalization, a variety of writing tools, self-evaluation, and differentiated instruction. Researchers trained classroom teachers in the program. Then, the teachers provided the instruction to their students in three 30-min lessons each week for eight weeks.

Group Two (control): Received no additional intervention and continued with BAU.

The measures included: (a) alphabet writing (accurate and fluent), (b) spelling (letters and sounds).

The students in Group 1 (multicomponent handwriting) showed significant progress in handwriting and overall spelling skills. Researchers found statistically significant differences in the adjusted means for alphabet writing and spelling measures between the intervention and the control group. This study highlights the reciprocal benefits that an integrated, multi-component intervention provided, as explicit handwriting instruction improved letter writing skills as well as spelling skills.

Berninger et al. (2002)

Berninger and colleagues hypothesized that explicit instruction would result in greater overall learning than repeated practice alone. This study included ninety-six, third-graders with low compositional fluency. The study duration was 24 lessons over four months. Each session took place in a small group setting (six students) and lasted for 20 min. The researchers designed four treatment conditions:

Group 1: In this group the tutors provided explicit instruction in the alphabetic principle (phonemic awareness, repeated practice of letter-sound correspondences) for 4 min, students applied the alphabetic principle to spelling words (single words from dictation) for 6 min, and then for 10 min researchers provided explicit instruction for alternations (same phoneme spelled in more than one way).

Group 2: For this group the tutors facilitated a reflective-discussion with pairs of students focused on the lesson goal (planning, translating, reviewing, revising informational and persuasive essays) for 10 min. This was

followed by either 10 min of tutor-guided scaffolded instruction to implement graphic organizers or 5 min independent writing time (writing a draft using the graphic organizer) and 5 min of reading their compositions to their peers.

Group 3: For this group the tutors provided explicit instruction in the alphabetic principle for 10 min (same as described for group 1). Followed by 10 min of explicit instruction in composing similar to group 2 except that all the instruction was tutor-directed and peer interaction was not encouraged.

Group 4 (control): For this group the tutors provided keyboard training (transcription) for 15 min and story writing (text generation) for 5 min. During the keyboard training, the students typed dictated letters, letters in alphabetic order, and with other variations (commas, spaces, reverse order, every other letter). Tutors did not include explicit instruction in either handwriting, spelling, or composing. During the story writing, the students practiced writing on various topics (e.g., my home, my favorite food, pets). Tutors did not provide explicit instruction in composition.

This study allowed the researchers to evaluate whether practice alone is sufficient for improving a skill or whether explicit, teacher-provided instruction is necessary for improvement in writing skills. The researchers included multiple measures to assess student ability: (a) handwriting automaticity task, (b) handwriting fluency, (c) spelling, (d) a spelling inventory (structure and content words), (e) compositional fluency and quality, (f) word identification and word attack.

The results indicated that all treatments increased compositional fluency. Group 1 (spelling) and Group 3 (spelling plus composing) were the most effective for spelling specific words (taught words), whereas Group 1 (teaching alternations) improved phonological decoding and transferred to spelling and composing. Group 2 (composing) and Group 3 (combined spelling plus composing) treatments were most effective for persuasive essay writing. Researchers found that only Group 3 (spelling plus composing) increased both spelling and composing. This study provided evidence that effective teaching of writing incorporated multiple instructional components (i.e., alphabetic principle, its alternations, reflection, and composing).

Summary of spelling outcome studies. The key finding in the studies discussed in this section that relates to the *Write Sounds* intervention is that combining multiple components produces gains in student spelling and writing. Explicit instruction delivered through a multi-component alphabet writing program significantly increased scores on alphabet writing and spelling measures. These gains were greater than those found with repeated practice in isolation. The *Write Sounds* intervention integrates several instructional components within a multi-component intervention using many components similar to those used in the studies reviewed in this section (i.e., letter formation, letter naming, phonemic awareness, alphabetic principle, and sentence-level writing).

How this Literature Informs Intervention Development for Struggling Writers

Altogether, this literature provides several takeaways that inform this dissertation. First, direct handwriting instruction, when implemented consistently, positively impacts handwriting legibility and compositional fluency (Berninger et al., 1997; Graham et al., 1997, 2000). Second, direct handwriting instruction has been shown to improve spelling

skills (Lavoie et al., 2019; Berninger et al., 2002). Third, handwriting instruction as it relates to these interventions appears to provide additional benefits in transcription and related reading skills (Berninger et al., 2006; Case-Smith et al., 2014; Lavoie et al., 2019; Berninger et al., 2002). However, merely adding handwriting into an existing reading program may not have positive effects on word reading (Berninger et al., 2006). Based on the inconsistent results found in this review of literature, further research is needed to examine the relationship between handwriting instruction and word reading.

The research summarized in this chapter has examined the impacts of handwriting instruction on composition, spelling, and word-level reading instruction. However, I could not locate any studies that combined handwriting instruction with spelling and decoding instruction to determine if there might be additive effects. The concept of integrating handwriting and phonics into one intervention may be especially beneficial for students with word-level reading disabilities. First, providing explicit instruction in letter formation while attaching the corresponding phoneme provides opportunities to make grapheme-phoneme connections while mastering letter formation skills. Second, opportunities for students to make grapheme-phoneme connections may also improve phonemic awareness skills. Third, automatizing letter knowledge is the base for accurate word reading and may reduce working memory load, which is often underdeveloped in students with dyslexia or word-level reading difficulties (Berninger & Wolf, 2009; Neuhaus & Swank, 2001). Fourth, time constraints make it difficult for teachers to provide adequate instruction, therefore, the efficiency of integrated instruction is a potential benefit. Finally, the results of the studies examined in this literature review support the *Simple View of Writing* theory. When students showed improvement in

transcription skills their compositional fluency also increased (Berninger & Amtmann, 2003; Berninger et al., 2002).

Current Study

The current study built on the previous handwriting instruction research in five ways. First, the *Write Sounds* treatment condition included a focus on foundational transcription skills instruction to students that struggled with writing and word-level reading. As noted previously, the *Simple View of Writing* theory supported that when students showed improvement in transcription skills, their compositional fluency increased (Berninger & Amtmann, 2003; Berninger et al., 2002).

Second, previous studies found that phonemic awareness is an underlying skill necessary for reading and writing (Ehri, Nunes, Willows et al., 2001; Sanders et al., 2017). However, the previous handwriting research examined in this literature review found that overall phonological awareness instruction in isolation did not transfer to handwriting or composing skills (Berninger et al., 1997; Graham et al., 2000). To extend on that research, I integrated phonemic awareness instruction and explicit handwriting instruction in the *Write Sounds* treatment condition. This included a component that required students to verbalize the sounds while writing the letters to strengthen their procedural memory and build multisensory strategies.

Third, previous literature reported automatizing letter knowledge as the base for accurate word reading as it may reduce working memory load, which is often underdeveloped in students with dyslexia or word-level reading difficulties (Berninger & Wolf, 2009; Neuhaus & Swank, 2001). To build on this research, I added cumulative repeated-practice on alternating lessons in the *Write Sounds* treatment condition. I

designed the repeated opportunities for students to make grapheme-phoneme connections to improve phonemic awareness skills and master letter formation, freeing up working memory space to spell and decode the words.

Finally, time constraints make it difficult for teachers to provide adequate instruction in foundational skills for struggling students. The current study examined the potential benefit of efficiency of integrated instruction. Specifically, the *Write Sounds* treatment condition combined handwriting instruction, phonemic awareness, and spelling into 15 min lessons.

CHAPTER 3

Method

The purpose of the current study was to determine the usability, feasibility, and promise of the *Write Sounds* intervention on elementary-aged students experiencing handwriting and word-level reading difficulties. The first goal of this study was to determine if the *Write Sounds* intervention is usable and feasible, and if so, to what extent. In order to determine the usability, I examined the components and implementation of *Write Sounds*.

The second goal was to determine the promise of the *Write Sounds* intervention on handwriting, spelling, and decoding outcomes. To determine the promise, I implemented a randomized, Pre-Posttest Control Group Design as it is one of the most commonly used randomized field experiments (Shadish et al., 2002). I included pre- and posttest measures to evaluate students' improvement in handwriting, spelling, and decoding skills. Due to limited time and resources, the study was designed as a pilot test and intentionally underpowered.

Eleven weeks were planned to complete the study, including screening, pretests, full intervention, and posttest. Although, schools were shut down at the end of week five due to COVID-19. Therefore, the full intervention could not be completed and planned posttests could not be administered. However, it was possible to use the *Write Sounds* Mastery Test (which is included as a formative assessment in the program) as a posttest for the study. Table 3 compares the original designed use of each measure with the actual use of the measure due to the COVID-19 pandemic. Also, throughout the Method and

Results, I provide information about the original design and changes made due to COVID-19.

Table 3

Comparison of Designed and Actual Use of Each Measure

Measures	Designed Use of Measure	Actual Use of Measure
Handwriting		
THS-R Lion subtest	Screening	Screening
THS-R Frog subtest	Pre and Posttest	Pretest
Sentence Copying Task (HW Fluency)	Pre and Posttest	Pretest
Spelling		
Write Sounds Mastery Check 1	Formative	Posttest
Write Sounds Mastery Check 2	Formative	Not Administered
Write Sounds Mastery Check 3	Formative	Not Administered
Write Sounds Summative Assessment	Pre and Posttest	Pretest
Reading		
WIAT-III Pseudo-word Decoding	Screening	Screening
RC Pseudo-word Decoding	Posttest	Not Administered
DIBELS Oral Reading Fluency	Posttest	Not Administered
Phonemic Awareness		
CTOPP-2 Segmenting Non-words	Screening	Screening
Usability & Feasibility		
Questionnaire	post intervention	post intervention

Note. HW = handwriting, RC = researcher-created.

Research Team

I conducted this study with the help of three graduate research assistants (GRAs), two of whom were doctoral students (one in special education and one in a school psychology program), and one Master's student in special education. One GRA had a

teaching certification in special education, but did not yet have teaching experience outside of student teaching. Another GRA had a Master's degree in special education as well as one year of experience as a teaching assistant in a school for children with learning disabilities. The third GRA had completed comprehensive coursework in assessment of children.

The three GRAs administered and scored assessments, conducted reliability checks, and evaluated fidelity of treatment during the lessons. From this point forward, the GRAs and I are sometimes referred to collectively as *raters*, *GRAs*, *test administrators*, or “we.”

Participants & Setting

I conducted this study in three K-8 parochial schools located in the Midwest. Participants included classroom teachers and students.

Student Participants

Due to the fast pace of the intervention, I recruited second- and third-grade students and their classroom teachers for this study. In the *Write Sounds* scope and sequence, I included new learning lessons that introduced a minimum of two graphemes in a single lesson (with a maximum of five). In contrast, traditional handwriting programs introduced one grapheme per lesson (e.g., Zaner-Bloser Handwriting Program, Handwriting Without Tears). For students to be successful at this fast pace, I hypothesized that they would need to have previous exposure to the alphabetic principle.

After obtaining principal approval to conduct the research study in their respective elementary schools, I met with ten second- and third-grade classroom teachers to explain the research study and the *Write Sounds* intervention. Nine of the ten

classroom teachers expressed an interest in participating and gave their consent. Each classroom teacher submitted a list of six students from their classroom that met the study eligibility criteria. The students were required to be (a) in their classroom, (a) struggling with handwriting legibility, (c) experiencing word-level reading or spelling difficulties, and (d) have one of the four lowest scores in their classroom on a handwriting screener.

Based on teacher recommendations, I met with the selected students' parents, who expressed an interest in participating in the research study. After hearing information about the research study, student eligibility criteria, and a description of the *Write Sounds* intervention, parents that continued to express an interest in their students participating in the study provided their consent. Following parental consent, 39 potential student participants provided their assent to participate in the study if they qualified for eligibility based on the screening measure.

Next, potential participants completed the Test of Handwriting Skills-Revised Lion subtest as a handwriting screener (see measures). The four students with the lowest screener scores in each classroom qualified to participate in the study. Thus, five of the potential student participants did not meet the eligibility criterion of being one of the four lowest scorers in their classroom and did not continue in the study. In addition to those five students, another potential student participant moved during the screening process and did not participate.

Following the consent and screening process, the student participants included 18 second-grade and 15 third-grade students from nine classrooms across three different schools. Parents of the student participants provided demographic information, including sample size, grade level, gender, language, ethnicity, IEPs, and free- or reduced-price

lunch. All students participants were fluent English speakers, including the four Spanish speaking students. The demographic characteristics for each study condition are reported in Table 4.

Table 4

Demographic and Descriptive Characteristics of Student Participants by Group

	Experimental (<i>n</i> = 17)	Control (<i>n</i> = 16)
Demographics	<i>n</i> (%)	<i>n</i> (%)
Grade		
2 nd	9 (53%)	9 (56%)
3 rd	8 (47%)	7 (44%)
Gender		
Female	8 (47%)	7 (44%)
Language		
English	14 (82%)	15 (94%)
Spanish	3 (18%)	1 (6%)
Ethnicity		
Caucasian	14 (82%)	14 (87%)
Hispanic	3 (18%)	2 (13%)
Free-reduced Lunch	4 (29%)	6 (38%)
IEPs	3 (18%)	2 (13%)
Screening Measures	M(SD)	M(SD)
CTOPP-2 (Segmenting Nonwords)	79.69 (8.26)	82.50 (13.78)
THS-R (Lion)	96.29 (19.71)	91.69 (16.12)
WIAT-III (Pseudo-word Decoding)	88.25 (14.58)	95.69 (13.77)

Note. IEP = individualized education plan; CTOPP-2 = Comprehensive Test of Phonological Processing-Second Edition; THS-R = Test of Handwriting Skills-Revised; WIAT-III = Wechsler Individual Achievement Test-Third Edition.

With the help of the GRAs, I administered pretest measures before random assignment within one week of the intervention's start. To minimize bias, my advisor assisted with matching and randomization procedures. Due to the small sample size, we matched the participants based on two variables prior to randomization (i.e., classroom teacher and Test of Handwriting Skills -Revised Lion subtest standard score). We combined a stable and reliable variable (grade level teacher) and an assessment variable to match the students. Specifically, students within the teacher's classroom were paired (two highest and two lowest), and then one student from each pair was randomly assigned to each treatment condition. (Shadish et al., 2002, pg. 121). We then randomly assigned the student participants using a random number generator to one of two conditions:

- Treatment group (T)- Fifteen min of explicit, integrated handwriting instruction using the *Write Sounds* intervention.
- Control group (C)- BAU instruction

Next, I tested for possible pre-intervention group differences using chi-square analyses and independent samples *t*-tests. There were no statistically significant differences between students randomly assigned to each condition on the following demographic variables: grade ($\chi^2_{(1)} = .04, p = .849$), gender ($\chi^2_{(1)} = .04, p = .849$), primary language ($\chi^2_{(1)} = 1.01, p = .601$), free & reduced lunch status ($\chi^2_{(1)} = .76, p = .465$), IEP status ($\chi^2_{(1)} = .17, p = 1.000$), and ethnicity ($\chi^2_{(1)} = .17, p = 1.000$). Additionally, there were no statistically significant differences between the students assigned to each group on the following screener measures administered prior to randomization: WIAT-III pseudo-word subtest ($t_{(30)} = -1.48, p = .148$), CTOPP-2

Segmenting Non-word subtest ($t_{(30)} = -.70, p = .489$), and THS-R Lion subtest ($t_{(31)} = .73, p = .470$).

Teacher Participants

The teacher participants included the student participants' nine classroom teachers, including five second-grade and four third-grade general education teachers from three different private elementary schools. I planned to collect teacher participants' demographic information at the end of the study in conjunction with the usability and feasibility questionnaire. Unfortunately, the sudden closure of the schools due to the COVID-19 pandemic hampered the collection of that information (more details are provided in the Results).

Measures

The pre and posttest assessments included both norm-referenced and researcher-created measures. I administered and scored the assessments with the help of the three GRAs. I first provided the GRAs with four hours of training on the administration and scoring of each measure. The training model included modeling, guided practice, and partner practice for each measure. Two raters then scored each measure. Pairs of raters resolved disagreements through discussion. Next, I calculated an interrater reliability statistic in two ways: I correlated the scores between the two raters or used point-by-point agreement depending on the type of measure. The findings can be found in the Results. A reliability score of .80 or higher is considered acceptable (Shavelson & Webb, 1991).

Teacher Questionnaire

The teacher questionnaire contained 16 total questions. I designed fifteen questions to examine three areas of usability and feasibility: the instructional materials

(teacher manual, student response book, fluency notebook), the intervention structure (lesson format, content integration, scope and sequence, duration, and dosage) and implementation fidelity. Each item on the questionnaire required a response on a Likert-type scale of either 1) Strongly Disagree, 2) Disagree, 3) Undecided, 4) Agree, and 5) Strongly Agree. In addition to the Likert response scale, each question included a section for the teacher participants to provide an open response (see Appendix A). The final question directed the teacher to describe the instruction that took place in their classroom when the treatment group students received the *Write Sounds* intervention. Additionally, I included a demographics survey (i.e., ethnicity, gender, education background, experience, educational certifications) with the questionnaire to describe the teacher participants.

In the original study design, I planned to provide each teacher participant with a printed copy of the *Write Sounds* teacher manual, student response book, and scope & sequence document after the completion of the treatment group intervention. The plan involved scheduling teacher participants to complete the questionnaire while our research team administered the posttest assessments. This sequence of events was designed to allow me to provide in-person reminders to the teacher participants and pick up the completed questionnaires at the school. Unfortunately, the schools closed due to the COVID-19 pandemic, and in-person contact with the teachers was no longer possible. Therefore, I emailed electronic copies of the questionnaire, teacher manual, student response book, and the intervention scope and sequence for the teachers to review and complete.

Screening Measures

The screening measures included norm-referenced assessments in three content areas: (a) handwriting, (b) phonemic awareness, and 3) decoding. The norm-referenced measures included subtests from the Test of Handwriting Skills, Revised (THS-R; i.e., lion), Comprehensive Test of Phonological Processing, 2nd Edition (CTOPP-2; i.e., segmenting non-words), and Weschler Individual Achievement Test, 3rd edition (WIAT-III; i.e., pseudo-word decoding).

Phonemic Awareness Measure, CTOPP-2, Segmenting Nonword Subtest. As previously mentioned, phonemic awareness is a foundational skill for reading and writing. The ability to segment individual phonemes is one of the foundational skills necessary for reading and spelling (Ehri, Nunes, Willows et al., 2001; Sanders et al., 2017). Therefore, I included one subtest from the Comprehensive Test of Phonological Processing Skills, 2nd Edition (CTOPP-2), as a measure of phonological awareness skills.

The CTOPP-2 is a norm-referenced measure of phonological processing skills (i.e., phonological awareness, phonological memory, phonemic awareness and rapid naming; Wagner et al., 2013). The test developers collected normative data in 2008 and 2009 on 1,900 students ranging from ages six to 24 years. The CTOPP-2 is administered individually and is appropriate for ages four to 24 years. The test consists of 12 subtests (i.e., elision, blending words, sound matching, phoneme isolation, blending nonwords, memory for digits, nonword repetition, rapid digit naming, rapid letter naming, rapid color naming, and rapid object naming) combining to give five composite scores (i.e., phonological awareness, phonological memory, rapid naming, rapid non-symbolic naming, and alternate phonological awareness). Reliability of the subtests and composites

are reported by average internal consistency coefficients to be above .80 for all subtests except nonword repetition ($\alpha = .77$).

To evaluate each participant's ability to segment words, I included the Segmenting Nonwords subtest as one of the study measures. This phonemic awareness measure provided information on the students' ability to segment nonsense words. The Segmenting Nonwords subtest has an alpha of .90 across all ages. We administered this subtest in a one-on-one format. The test administrators followed the procedures for administration as directed in the examiner's manual. The test administrator prompted students to listen to the made-up word, repeat the word, and then say the word one sound at a time. The test administrators scored the measure on-site while audio recording the student responses. Then, a second trained GRA scored each assessment using the audio recording. The inter-rater reliability obtained was 0.84; the raters resolved any differences through discussion.

Decoding Measure, WIAT-III, Pseudo-word Decoding Subtest. Because reading and writing are reciprocal processes (Ehri, 2005; Graham et al., 2017; Graham & Hebert, 2011), I included a decoding measure to provide information on the participants' ability to attach phonemes to corresponding graphemes.

The WIAT-III is an individually administered diagnostic achievement test designed for students in pre-kindergarten to twelfth grade (Breux, 2010). The WIAT-III was normed in the United States on 2,775 students. There are sixteen academic skills assessed with the WIAT-III. For this study, I administered the sub-test of Pseudo-word Decoding. Internal consistency reliabilities of the pseudo-word decoding are over .80 for

all groups. The reliability coefficient for the grade-based sample in spring was .97 for both the letter/word reading (pseudo-word decoding).

The test administrator placed the pseudo-word reading card in front of the student and followed the WIAT-III administration guidelines to prompt the students to read the made-up words as best they can. The test administrator scored each item immediately following the student response, and also audio recorded the student responses. Then, a second trained GRA scored each assessment using the audio recording. The inter-rater reliability obtained was 0.96; the two raters resolved any differences through discussion.

Handwriting Outcome Measure, THS-R, Lion Subtest. This handwriting measure provided information about student foundational writing abilities in letter formation and writing fluency. THS-R is a norm-referenced assessment of handwriting and neurosensory integration skills in both manuscript and cursive (Milone, 2007). Test developers normed the THS-R in the United States on 1,500 children and is appropriate for children aged 5-18 years. Internal consistency reliabilities were between .61-.85. The assessment consists of seven subtests. I chose this assessment because the measures evaluated students' handwriting legibility and accuracy. Also, the test developers included a standard score conversion chart for each subtest.

For the current study, we administered the Lion subtest as a screening measure. Test administrators provided the students with the appropriate student response form and read the following directions aloud as directed in the THS-R manual,

“You should see a lion at the bottom of the page. Do not pick up your pencil yet. Listen carefully. On this page, I would like you to write each word that I say. Use your best handwriting. If you do not know a word or can't write a word, try to

spell it the best way you can. If you can't spell it at all, skip the word and write the next word that I say. Do you have any questions?"

The students wrote each word to the best of their ability. Test administrators dictated the six words (my, fish, and, blue, flip, vest) as directed in the administration directions.

Students had as much time as needed to respond, and test administrators did not continue to the next item until everyone in the group was ready. Using the THS-R scoring criteria shown in Table 5, one rater scored each student assessment, and then another rater scored the measure a second time. Raters scored each of the 21 letters on a scale of 0-3 points for a total of 63 possible points (score range 0-63). The inter-rater reliability obtained was 0.95; the two raters resolved any differences through discussion.

Intended Pre-Posttest Measures (pretest only due to COVID)

The original study design included pre-posttest and posttest only assessments that included norm-referenced and researcher-created measures assessing three content areas: (a) handwriting, (b) decoding, and (c) encoding. As shown in Table 3, two posttest-only measures, Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Oral Reading Fluency subtest and the researcher-created pseudo-word decoding measure were not administered. Therefore, I elected not to describe those measures.

We did administer the norm-referenced measure the THS-R Frog subtest and the researcher-created measures Sentence Writing Fluency the *Write Sounds* Summative assessment (WS Summative assessment) at pretest. However, due to the COVID-19 pandemic and the closure of all the schools, as well as the suspension of in-person research activities, the following measures were not administered at posttest: (a) THS-R Frog subtest, (b) Sentence Writing Fluency measure (Quick Brown Fox copy task), (c)

Researcher-created Pseudo-word Decoding measure, (d) Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Oral Reading Fluency subtest and (e) WS Summative assessment. Therefore, I used the Write Sounds Mastery Check 1 (WS Mastery Check 1) as a proxy for the posttests. The next section includes a detailed description of each measure completed by the participants.

Table 5

Test of Handwriting Skills-Revised Scoring Criteria

Score of 0
Letter is not written, Letter is reversed or inverted, Letter is written in wrong case, Letter is written in wrong format/style, Letter is not immediately recognizable, Letter is rotated at an angle of 45 degrees or more from the correct orientation, Child is unable to write spontaneously with any degree of accuracy
Score of 1
Letter is recognizable but somewhat distorted, Lines do not come together at the correct point of intersection causing a noticeable gap, Lines are broken and un attached, Letter is rotated noticeably at an angle of 30 degrees or less from the correct orientation, Parts of a letter are unattached, Parts of a letter are significantly larger or smaller than they should be, double lines are used instead of single lines, with an obvious space between the lines
Score of 2
Letter is written somewhat accurately but is slightly distorted, Lines overextend beyond the point of intersection or curve, Lines are made twice, but there is no space between the lines, lines are broken but attached, proportions of a letter are slightly incorrect, such as one part of “W” being slightly smaller than the other, Letter may be rotated slightly from the correct orientation
Score of 3
Letter is written accurately and resembles the ideal for its style, Letter may be rotated slightly from the correct orientation

Handwriting Outcome Measures. As previously stated, the handwriting measures provide information about student foundational writing abilities in letter formation and writing fluency. I included one proximal handwriting measure to evaluate individual letter formation, and one distal handwriting measure to examine the impacts of the intervention on handwriting fluency.

THS-R, Frog Subtest. We administered the Frog subtest to small groups (between two-six) of students. The test administrators provided the appropriate student response form and read the following directions aloud to the students as directed in the THS-R manual,

“You should see a frog at the bottom of the page. Do not pick up your pencil yet. Listen carefully. On this page, I would like you to write each lowercase (small) letter that I say. You can write the letters in more than one row if you would like. Use your best handwriting. If you do not know a letter or can’t write a letter, skip it and write the next letter that I say. Do you have any questions?”

Each student wrote the letters of the alphabet in lowercase manuscript as directed. The test administrator dictated each letter of the alphabet in a random order, per the administration directions. The test administrator allowed students to use as much time as needed to respond and did not continue to the next item until everyone in the group was ready. Two raters scored each assessment, blind to condition, as directed by the THS-R scoring guide (see Table 5). The scoring guide procedures were the same as described for the Lion subtest in the screening sections, and raters scored each of the 26 letters written on a scale of 0- 3 points for a total of 78 possible points (score range 0-78). The inter-

rater reliability obtained was 0.99; the two raters resolved any differences through discussion.

Sentence Copying Task. The sentence copying task measured students' handwriting fluency. Each student copied the sentence, "*The quick brown fox jumps over the lazy dog,*" as many times as possible, in a one-min time frame. I chose this sentence based on previous handwriting research studies (Berninger et al., 1997; Berninger et al., 1998) as a measure of handwriting fluency and included every letter from the alphabet. Each test administrator gave the student a typed copy of the sentence prompt, and a sheet of wide-ruled notebook paper. Then, the test administrator provided the following verbal instructions:

"Copy the sentence as quickly and accurately as you can. If you finish copying the sentence once, then copy it again. Keep going until I tell you to stop."

The test administrator then set a timer for one-min and prompted the students to begin. Upon completion and blind to condition, two raters scored each assessment for legibility and letter formation accuracy (Berninger et al., 1998). The raters considered a letter "correctly written," if the letter was the correct case, recognizable out of context, proportional, and aligned with the lines on the paper (Berninger et al., 1997). The inter-rater reliability obtained was 0.93; the two raters resolved any differences through discussion.

Decoding and Encoding Measures, Write Sounds Summative Assessment. As stated previously, reading and writing are reciprocal processes (Ehri, 2005; Graham et al., 2017; Graham & Hebert, 2011), so I included decoding and encoding measures to provide information on the participants' ability to attach phonemes to corresponding

graphemes. The measures included tasks at the letter and word-level of decoding and encoding.

I created four curriculum-based formative assessments to measure mastery of the intervention content. The measures assess the content covered in each set of eight lessons (except the first Mastery Check, which was administered after lesson 4, see Appendix B). The content covered by the mastery checks was cumulative (i.e., Mastery Check 1 covers lessons 1- 4 , Mastery Check 2 covers lessons 1- 16, Mastery Check 3 covers lessons 1- 24, and the WS Summative Assessment covers lessons 1 – 27). Each Mastery Check and the Summative Assessment consisted of two dictation tasks. In the first task, the teacher dictated a list of the phonemes introduced up to the point of the assessment. The students wrote the grapheme that corresponds to the dictated phoneme. In the second task, the teacher dictated a sentence that incorporated the letters introduced up to the point of the assessment. The students wrote the dictated sentence independently. To determine pre-existing knowledge of the content covered in the *Write Sounds* intervention, we administered the WS Summative Assessment as a pre-posttest measure (see Appendix B).

The test administrator conducted this measure with small groups of two to six students. For the first task, the test administrator placed one sheet of wide-ruled notebook paper in front of each student and gave the following directions:

“I am going to say several sounds one at a time after I say the sounds I want you to write the letter or letters that can make that sound.”

The test administrator then dictated each phoneme, one at a time, in the random order listed on the assessment sheet. For the second task, the test administrator placed a new

sheet of wide-ruled notebook paper in front of each student in the group and gave the following directions:

“I am going to say a sentence after I say the sentence I want you to write the sentence. You may not know how to spell all the words; just do the best you can.”

The test administrator dictated the provided sentence to the students and prompted them to repeat the sentence aloud. Finally, the test administrator dictated the sentence again in phrases, repeating as necessary at student request.

Using the following criteria, two raters scored each assessment. For task one, the scorer gave one point to each correct letter-sound correspondence. If students wrote more than one grapheme for each phoneme (e.g., the long /a/ sound can be represented with “ai”, “ay”, “a-e”; the /k/ sound can be represented with “k”, “c”, “ck”), raters accepted any grapheme that represented the target sound. The inter-rater reliability obtained was 0.97; the two raters resolved any differences through discussion. For task two, the scorer recorded two separate scores (a) spelling words and (b) overall legibility.

Spelling words: Students received one point for each correctly spelled word and one point for each word containing the correct letter case for all letters in the word for a score range of 0-24. The inter-rater reliability obtained was 0.95; the two raters resolved any differences through discussion.

Overall Legibility: Two raters scored overall legibility on a four-point scale for each of the following characteristics of writing quality: spacing, letter proportion, line placement, and a two-point scale for directionality, see Figure 1 for scoring guidelines. Each scorer totaled the four subscores and

reported an overall legibility score. The inter-rater reliability obtained was 0.92; the two raters resolved any differences through discussion.

Figure 1

Overall Legibility Scoring Guidelines

	1	2	3	4
Spacing	adequate	adequate	adequate	adequate
Between	spacing	spacing	spacing	spacing
Letters	between & within less than half the words	between & within half the words	between & within more than half the words	between & within all the words
Letter Proportion	appropriate letter proportion on less than half the letters	appropriate letter proportion on half the letters	appropriate letter proportion on more than half the letters	appropriate letter proportion on all the letters
Line Placement	appropriate letter placement on less than half the letters	appropriate letter placement on half the letters	appropriate letter placement on more than half the letters	appropriate letter placement on all the letters
Directionality	Not using left to right, return sweep direction in sentence writing	Using left to right, return sweep direction in sentence writing		

Note. Total Score of all for characteristics = Overall Legibility score

Intended Formative Measure (Posttest due to COVID), Write Sounds Mastery Check 1

Due to COVID-19 and the closure of the schools for the remainder of the year, I used the Mastery Check 1 formative assessment as a proxy for the originally planned posttest measures. Mastery Check 1 included content covered in lessons one through four (i.e., ten dictated phonemes, representing 13 graphemes; see Appendix B). As discussed

in the previous section, each Mastery Check consisted of two dictation tasks. In the first task, the teacher dictated a list of the phonemes introduced up to the point of the assessment. The students wrote the grapheme that corresponds to the dictated phoneme. In the second task, the teacher dictated a sentence that incorporated the letters introduced up to the point of the assessment. The students wrote the dictated sentence independently.

We gave this measure to small groups of two to four students. For the first task, test administrators placed one sheet of wide-ruled notebook paper in front of each student and gave the following directions:

“I am going to say several sounds one at a time after I say the sounds I want you to write the letter or letters that can make that sound.”

Then, the test administrator dictated each phoneme, one at a time, in the random order listed on the assessment sheet. For the second task, the test administrator placed a new sheet of wide-ruled notebook paper in front of each student in the group and gave the following directions:

“I am going to say a sentence after I say the sentence I want you to write the sentence. You may not know how to spell all the words; just do the best you can.”

The test administrator dictated the provided sentence to the students and prompted them to repeat the sentence aloud. Finally, the test administrator dictated the sentence again in phrases and repeated as necessary at student request.

As stated previously, the study was ended prematurely due to school closures to help combat the spread of COVID-19. Therefore, trained raters scored the two Mastery Check 1 tasks in five separate areas in order to assess student participants’ growth on multiple constructs: (a) spelling sounds (letter-sound correspondence in isolation), (b)

spelling words (letter-sound correspondence in context), (c) handwriting of letters, (d) handwriting of words, and (e) overall legibility. We scored each assessment using the scoring criteria outlined in the following sections.

Spelling Sounds (Task 1). Raters awarded one point for each correct letter-sound correspondence. Students could have written more than one grapheme for each phoneme (e.g., the long /a/ sound can be represented with “ai,” “ay,” “a-e;” the /k/ sound can be represented with “k,” “c,” “ck”). Therefore, raters accepted any grapheme that represented the target sound for a score range of 0-13. The inter-rater reliability obtained was 0.98; the two raters resolved any differences through discussion.

Spelling Words (Task 2). Raters awarded one point for each correctly spelled word and one point for each word containing the correct letter case for all letters in the word for a score range of 0-18. The inter-rater reliability obtained was 0.92; the two raters resolved any differences through discussion.

Handwriting Letters (Task 1). Raters scored handwriting letters, as directed by the THS-R scoring guide (see Table 5). The scoring guide procedures were the same as described for the Frog subtest in the pretest sections, and raters rated each of the ten letters written on a scale of 0- 3 points for a total of 30 possible points (score range 0-30). The inter-rater reliability obtained was 0.98; the two raters resolved any differences through discussion.

Handwriting Words (Task 2). Raters scored handwriting words, as directed by the THS-R scoring guide (see Table 5). The scoring guide procedures were the same as described for the Lion subtest in the screening sections, and raters scored each of the 21 letters written on a scale of 0- 3 points for a total of 63 possible points (score range 0-63).

The inter-rater reliability obtained was 0.93, the two raters resolved any differences through discussion.

Overall Legibility (Task 2). Raters scored overall legibility on a four-point scale for each of the following characteristics of writing quality: spacing, letter proportion, line placement, and a two-point scale for directionality, see Figure 1 for scoring guidelines. Each scorer totaled the four subscores and reported an overall legibility score. The inter-rater reliability obtained was 0.95, the two raters resolved any differences through discussion.

Adjusted Write Sounds Summative Assessment. Since the designed WS Summative assessment pretest measure (Task 1) included 38 phonemes and Mastery Check 1 (Task 1) included only 10 phonemes, I adjusted the pretest measures for equivalence. To do this, I truncated the WS Summative assessment Task 1 given at pretest to include only spelling sounds items that were aligned with items in Mastery Check 1. I combined the separated items to create the Write Sounds Handwriting Letters (WS Handwriting Letters) and Write Sounds Spelling Sounds (WS Spelling Sounds) pretest measures to compare with WS Mastery Check 1.

Write Sounds Treatment Condition

As previously described in the Introduction, the purpose of the *Write Sounds* intervention was to increase foundational handwriting and encoding skills. I included integrated instruction of graphemes and the corresponding phonemes in the context of spelling in the intervention. This component is a critical component for students with dyslexia or word-level reading difficulties (Graham et al., 1997), and sets the *Write Sounds* intervention apart from the other programs. In addition to the grapheme-phoneme

integration, there are multiple opportunities for repeated practice, which has been found to be effective for students with word-level reading difficulties, including dyslexia (Berninger et al., 2008). The *Write Sounds* instructional components are listed in Table 1 by lesson. Student tasks associated with each instructional component are described in Table 6.

Due to time and resource constraints, I provided the instruction for all of the treatment groups. As the lead developer of the *Write Sounds* intervention, I designed the implementation procedures, and therefore did not require training. However, prior to the start of instruction, I practiced delivering the instruction with one of the GRAs, who provided feedback during and after the practice sessions.

Table 6

Description of Write Sounds Lesson Student Tasks

New Learning Lesson Student Tasks	Cumulative Lesson Student Tasks
1) New Letter Tracing*	1) New Letter Writing*
2) New Letter Copy*	2) Writing Dictated Letters***
3) New Letter Writing*	3) Writing Dictated Words***
4) Writing Dictated Letters**	4) Writing Dictated Sentence***
5) Writing Dictated Words***	5) Sentence Fluency Writing (two-min timed practice)

Note. * = task is repeated for each new letter introduced in that lesson. ** = includes all new letters introduced in that lesson, *** = all words include letters that have been taught in this lesson or in previous lessons.

BAU Control Condition

The BAU control group participated in daily activities or instruction provided by the students' grade-level teachers. The instruction received varied by the students' grade

level and school, as students were pulled for the intervention at different times during the day (e.g., centers, computer time, literacy, social studies, or science instruction).

Although the research plan included surveys for all of the classroom teachers to describe the classroom instruction, only two teachers were able to answer the survey following the COVID-19 interruption. Nevertheless, the differences in the two classrooms illustrate the likely variation in instruction across the classrooms included in the study. In one second-grade classroom, the control students participated in cursive handwriting instruction. The teacher modeled cursive letter formation, showing each stroke. Furthermore, the teacher wrote sample letters, some with mistakes, and prompted the students to assess the samples for correct and incorrect formation. In another second-grade classroom, the control group did not receive direct handwriting instruction during the study. Instead, the students in the control group worked on completing daily literacy work or participating in a read aloud. Classroom teachers did not observe the treatment group lessons, nor did they have access to any of the intervention materials before or during the study.

Procedures

Screening, pretesting, and randomization took place over a two-week period. Instruction for the treatment group began the day after the researchers randomly assigned the students to either the treatment or control condition. The instructor traveled between the three schools (School 1, School 2, School 3) to deliver the intervention in small groups of three to four students. The number of groups at each school varied depending on the number of teachers at each grade level. School One had one group of combined

second- and third-grade students, while Schools Two and Three each had one second-grade group and one third-grade group.

I delivered the instruction in different locations within each school based on available space. The group at School One met in either the counselor's or principal's office, both groups at School Two met in a designated space at the end of the hallway, and both groups at School Three met in an unused classroom space. Groups met for the intervention four days per week through a 15 min pull out session during the school day. The day of the week varied based on teacher schedules and school activities. Some weeks not all groups met on four days due to ITBS testing and various school-wide activities. I made-up missed days whenever possible. After three weeks of instruction, the schools were closed due to the COVID-19 pandemic. Therefore, we could not administer the posttest assessments as designed.

Treatment Fidelity and Dosage

In order to examine treatment fidelity, I created fidelity checklists that contained the possible elements in each lesson (see Appendix D). Trained GRAs used the checklists to measure adherence to the required elements observed. Overall, GRAs observed 27% of the lessons in-person across groups and weeks of instruction. I calculated fidelity in two ways. In the first method, lesson components not taught due to time limits were not examined. In the second method, all lesson components were examined regardless of instruction delivered.

To examine dosage, I compared the number of lesson components completed to the total number of components intended for each lesson. After inspection of each of the student response books to determine the elements completed for each lesson, I calculated

dosage per student as a percentage of the total lesson components for the first 10 lessons of the intervention (i.e., the lessons taught in the study). I included all missed lesson components in the calculation, including those missed due to student absence. Finally, I calculated mean group dosage by averaging the number of elements completed across students.

Data Analysis

I calculated descriptive statistics to determine the mean and standard deviation for the treatment and control conditions on each of the measures. I also used inferential statistics to draw conclusions about the promise of the *Write Sounds* intervention. First, I calculated chi-square and independent-samples t-tests to describe the differences between the demographic variables and screening measures. Next, I conducted Pearson correlation coefficients between the screening and pretest measures. In order to detect pretest differences between groups with a small sample size in addition to p-values, I also reported the pretest effect sizes. Then, I tested for differences in outcomes between the *Write Sounds* treatment group and the BAU control group using Analysis of Covariance (ANCOVA) for the handwriting and spelling measures. I included pretest scores for the corresponding measure as the covariate in each model to ensure that posttest differences are not due to pretest differences between students in each of the experimental groups and to account for possible variance in the posttest scores. Before running the analyses, I tested for the assumptions of ANCOVA (i.e., values of the covariates cannot vary across the independent variable, homogeneity of regression slope) and both assumptions were met for all analyses.

Finally, to examine the size of the effects, I computed Cohen's d using the adjusted means on posttest group differences found through the ANCOVA results (Cohen, 1988). To control for small sample bias, I converted the Cohen's d statistics to Hedge's g for each posttest measure using a small sample correction (Hedges, 1981). This calculation served as a frame of reference for the possible effect of the intervention on the outcomes and was valuable because of the small sample size.

CHAPTER 4

Results

The purpose of the current study was to evaluate the usability, feasibility, and promise of the *Write Sounds* intervention in an elementary school setting for students with word-level reading or writing difficulties. One research question addressed the utility of the intervention in schools, based on fidelity, dosage, and teacher feedback, whereas the other two research questions addressed the *promise* of the intervention for impacting student handwriting and spelling outcomes. The focus was on *promise*, rather than efficacy, as the study was intentionally underpowered due to resource constraints. I assessed the promise of the program by examining effect sizes.

Results for Usability and Feasibility of *Write Sounds* Intervention

Due to the forced closure of the schools by the state during the COVID-19 pandemic, communication with the teachers was hindered. Teachers received multiple emails that included the questionnaire and *Write Sounds* materials for review and completion. After six weeks, only two of the nine teacher participants provided responses. Therefore, results reflect the feedback from only those two teachers. Both teachers taught in general education, second-grade classrooms at the time of the study. However, they had previous experience teaching in grades 3, 4, and 5, with four and 13 total years of experience respectively.

Both teachers agreed that the structure of the intervention was appropriate (i.e., 15-min session time, 27 lesson duration, new learning/cumulative review instructional sequence) and was sufficient to implement the intervention. One of the teachers strongly agreed that the soft script style of the teacher manual provided clarity and included

appropriate supports. The second teacher was undecided, as she felt she did not have time to examine the manual thoroughly due to other time constraints related to the COVID-19 pandemic. On the other hand, there was favorable agreement that the student response book included clear directions and sufficient opportunities for repeated practice. The teachers also strongly agreed that the handwriting fluency component would be beneficial for students.

Both teachers strongly agreed that the integration of phonics and handwriting was beneficial for students. One of the comments was, “*I appreciate that it addresses the handwriting difficulties while reinforcing reading skills.*” There were also favorable comments regarding the level of word difficulty and grapheme introduction sequence. One teacher felt that all the necessary instructional components were represented. In contrast, the other teacher felt that the intervention did not include all the components they would look for in a handwriting curriculum. Although she did not elaborate on what components lacked, she indicated that the contextual practice of meaningful words and sentences was helpful for students.

Also, when considering the pacing of grapheme instruction, one teacher agreed with the introduction of three to four graphemes per lesson while the second teacher was undecided. She felt that the pacing in the manual seemed good but did not feel qualified to provide feedback since she did not observe the treatment group instruction. Both teachers agreed that *Write Sounds* is appropriate for second-grade struggling writers. However, neither teacher felt that they could rate the appropriateness for 3rd grade struggling writers since, although they both had previous experience teaching third grade, they were not as familiar with the curriculum at their current school. Finally, both

teachers stated that they would use the intervention with their struggling students as a supplement.

Treatment Fidelity

Based on the fidelity checklists completed by GRAs, I calculated the fidelity score on the lesson components completed in the allotted lesson timeframe, excluding the components the students did not complete due to time constraints. I implemented the *Write Sounds* intervention with a high degree of fidelity, with 99.6% of the instructional steps completed accurately. Next, I calculated the fidelity score on all designed lesson components, regardless of time constraints; I implemented the intervention with 94.9% of the instructional steps completed as intended. The high degree of fidelity offered evidence for the usability of the intervention. In addition to fidelity, I calculated dosage of the intervention to evaluate feasibility.

Treatment Dosage

Higher amounts of dosage illustrate better ability to implement the intervention components in a small group setting within the fifteen-min session. For reference, I reported the student tasks for each lesson in Table 6. For the majority of the lessons, I was able to complete the lessons within the 15-min time frame allotted. However, for lessons 6, 8, and 10, I did not complete the Fluency Training task. Additionally, there were a few sessions where I was unable to complete all the intended tasks due to classroom complications (e.g., class at the library, tutoring room occupied for a meeting, announcements, or class pictures), which resulted in less than 15-min sessions. I calculated dosage for lessons 1 – 10 as a proportion of lesson components completed by the student divided by the total number of possible components intended. The total

number of tasks possible to complete ranged between 37-46, depending on the number of lessons each group received. On average, the students completed an average of 34 tasks (range = 18-42). When calculating the dosage for each activity, an average 81% of the activities were completed, with a range of 0-100%.

With the closure of the schools due to COVID-19, the treatment group did not complete the entire intervention. Additionally, prior to school closures, there were many COVID-19 related disruptions. This impacted the collection of data on the writing fluency task. The fluency task did not begin until lesson six and was only included in the cumulative review lessons, therefore by the time I provided instruction on lesson six, and beyond there were many COVID-19 related distractions that caused my groups to end early or start late. Due to those distractions and limited intervention time, the groups did not receive instruction on the writing fluency task. Still, we did have nearly 15-min to complete each lesson, meaning a 0% completion rate suggested that the 15-min allotted time frame was not sufficient to complete the cumulative review lessons.

Results for the Promise of the *Write Sounds* Intervention

The second and third research questions focused on the promise of the intervention for impacting student handwriting and spelling outcomes. I report the correlations between the screening and pretest measures in Table 7. There was a moderate, significant correlation between WS Spelling Words pretest and all three handwriting pretest measures: THS-R Lion, THS-R Frog, and WS Overall Legibility. Also, there was a moderate and significant correlation between the THS-R Frog and WS Overall Legibility measures. I used Analysis of Covariance (ANCOVA) to test for differences in outcomes between the *Write Sounds* treatment group and the BAU control

group for the handwriting and spelling measures. ANCOVA allowed me to adjust for pretest differences between students in each of the experimental groups. I also calculated Cohen's d using the adjusted means on posttest group differences found through the ANCOVA (Cohen, 1988). To control for small sample bias, I converted the Cohen's d effect sizes to Hedge's g for each posttest measure using a small sample correction (Hedges, 1981). I describe the results in more detail according to the corresponding research question in the next sections.

Table 7

Correlations for Screening and Pretest Measures

Measures	1	2	3	4	5	6	7	8
1. CTOPP-2 Segmenting	—							
2. WIAT-III Pseudo-word	.24	—						
3. THS-R Lion subtest	.33	-.06	—					
4. THS-R Frog subtest	.25	.17	.31	—				
5. Sentence Copying Task	.20	.06	.23	.22	—			
6. WS Legibility Pre	.10	.02	.29	.41*	.29	—		
7. WS Spelling Sounds Pre	.18	.25	-.08	-.07	.07	.06	—	
8. WS Spelling Words Pre	.06	.03	.49**	.49**	.33	.39*	.00	—

Note. CTOPP-2 = Comprehensive Test of Phonological Processing-Second Edition, WIAT III = Weschler Individual Achievement Test-Third Edition THS-R = Test of Handwriting Skills-Revised, WS = Write Sounds, HW = handwriting.

* $p < .05$, ** $p < .01$.

RQ 2 Promise of Write Sounds to Improve Students' Handwriting Skills

As previously reported in Table 3, although the THS-R Frog subtest and researcher-created Sentence Copying Task measures were originally intended to also be administered at posttest, I did not administer them due to the sudden closure of all schools during the COVID-19 pandemic. Therefore, I have reported them here as pretest

only measures, THS-R Frog subtest ($t_{(30)} = -.51, p = .617$) and Sentence Copying Task ($t_{(30)} = .05, p = .959$). Means and standard deviations for the pretest only measures are reported in Table 8 by group.

The descriptive statistics, Hedge's g effect size, and confidence intervals are reported for the pre- and posttest measures that I was able to administer, including the WS Mastery Check 1 formative measure which served as a proxy for the posttest

Table 8

Pretest Only Means and Standard Deviations by Group

Measures	Experimental ($n = 17$)	Control ($n = 16$)
	M (SD)	M (SD)
THS-R (Frog)	95.63 (15.26)	98.13 (12.63)
Sentence Copying Task	31.31 (18.42)	31.00 (15.31)

Note. THS-R = Test of Handwriting Skills, Revised.

measures. The means and standard deviations of the handwriting outcome measures, (a) WS Handwriting Letters, (b) WS Handwriting Words, and (c) WS Overall Legibility pre- and posttest measures are reported in Table 9. There were no significant

Table 9

Means and Standard Deviations for Handwriting Pre-Posttest Measures

Measure	Treatment		Control	
	M	SD	M	SD
WS HW Letters Pre	18.35	5.49	17.19	5.54
WS HW Letters Post	24.65	3.39	21.31	4.89
WS HW Words Post	49.29	5.84	42.44	8.00
WS Legibility Pre	9.35	1.58	9.19	1.17
WS Legibility Post	10.29	1.61	9.00	1.32

Note. Treatment $n = 17$, Control $n = 16$; WS = *Write Sounds* researcher-created measure; HW = handwriting.

differences between the groups at pretest. However, because this study was underpowered, I calculated pretest effect sizes for each of the handwriting measures to determine whether there were potential practically significant differences between the groups that should be controlled for in the analyses. The pretest effect size for the WS Handwriting Letters pretest measure was $g = 0.21$, 95% *CI* [-0.48, 0.89], THS-R Lion pretest measure effect size was $g = 0.25$, 95% *CI* [-0.45, 0.94], and the WS Overall Legibility pretest measure effect size was $g = 0.11$, 95% *CI* [-0.57, 0.80]. The pretest effect size estimates for the WS Handwriting Letters pretest measure and the THS-R Lion pretest measure effect sizes were small and not statistically significant, but potentially practically significant, differences between the two groups. Therefore, I included the pretest measures as a covariate in all the models for consistency and to account for variation in the posttest scores.

I conducted an ANCOVA analysis for each of the measures, controlling for pretest effects, and reported the results in Table 10. The analyses indicated a statistically significant effect of treatment on all three handwriting posttest measures, WS Handwriting Letters ($F = 4.97$, $p = .033$), WS Handwriting Words ($F = 7.09$, $p = .012$), and WS Overall Legibility ($F = 6.49$, $p = .016$). Students in the *Write Sounds* treatment condition scored, on average, 3.34 points higher on the WS Handwriting Letters measure than students in the BAU control group.

After controlling for pretest effects, the effect size for the WS Handwriting Letters posttest measure was $g = 0.76$, 95% *CI* [0.05, 1.47]. Students in the treatment condition scored an average of 6.85 points higher on the WS Handwriting Words measure than the students in the BAU group. After controlling for pretest effects, the

effect size for the WS Handwriting Words posttest measure was $g = 0.91$, 95% *CI* [0.19, 1.63]. Students in the treatment condition also outperformed the control group on the WS Overall Legibility measure with the treatment group scoring an average of 1.29 points higher than the BAU group. After controlling for pretest effects, the effect size for the WS Overall Legibility posttest measure was $g = 0.86$, 95% *CI* [0.15, 1.58]. The results for all three handwriting measures are promising, especially considering that the intervention was only partially implemented.

Table 10
ANCOVA Analyses of Handwriting Measures

Source	SS	MS	df	F	<i>p</i>	η^2
WS Handwriting Letters Post						
Corrected Model	92.00	46.00	2	2.56	.094	.15
Intercept	1402.23	1402.23	1	78.05	.000	.72
WS HW Letters Pre	.35	.35	1	.02	.890	.00
Group	89.36	89.36	1	4.97	.033	.14
Error	538.97	17.97	30			
Total	18134		33			
Corrected Total	630.97		32			
WS Handwriting Words Post						
Corrected Model	472.06	236.03	2	4.98	.014	.25
Intercept	1536.87	1536.87	1	32.45	.000	.52
THS-R Lion subtest	84.56	84.56	1	1.79	.192	.06
Group	335.55	335.55	1	7.09	.012	.19
Error	1420.91	46.36	30			
Total	7163		33			
Corrected Total	1892.97		32			
WS Overall Legibility Post						
Corrected Model	24.36	12.18	2	6.41	.005	.30
Intercept	22.87	22.87	1	12.04	.002	.29
WS Overall Leg Pre	10.557	10.56	1	5.56	.025	.16
Group	12.32	12.32	1	6.49	.016	.18
Error	56.97	1.899	30			
Total	3165.00		33			
Corrected Total	81.33		32			

Note. WS = Write Sounds researcher-created measure; HW = Handwriting; Leg = Legibility; THS-R = Test of Handwriting Skills-Revised.

RQ 3 Promise of Write Sounds to Improve Students' Spelling Skills

For this group of measures, I computed the descriptive statistics, Hedge's g effect size, and confidence intervals. Results are reported for the WS Spelling Sounds and WS Spelling Words pre- and posttest measures in Table 11. There were no statistically significant differences between the groups at pretest. However, because this study was underpowered, I calculated the pretest effect sizes for each of the spelling measures to determine whether there were potential practically significant differences between the groups that should be controlled for in the analyses. The effect size for the WS Spelling Sounds pretest measure was $g = 0.05$, 95% $CI [-0.63, 0.73]$ and the effect size for WS Spelling Words pretest measure was $g = -0.02$, 95% $CI [-0.71, 0.66]$. Although the effect sizes were negligible, I included them in the model for consistency in the analyses across all of the outcome measures in the study. I also conducted an ANCOVA analysis for each of the spelling measures, (a) WS Spelling Sounds and (b) WS Spelling Words controlling for pretest effects, results are reported in Table 12. The analyses indicated that students in the treatment condition did not statistically significantly out-

Table 11

Means and Standard Deviations for Spelling Pre-Posttest Measures

Measure	Treatment		Control	
	M	SD	M	SD
WS Spelling Sounds Pre	9.94	1.14	9.88	1.20
WS Spelling Sounds Post	9.88	0.33	9.62	0.80
WS Spelling Words Pre	19.00	2.62	19.06	2.49
WS Spelling Words Post	16.76	1.79	15.88	1.96

Note. Treatment $n = 17$, Control $n = 16$; WS = *Write Sounds* researcher-created measure.

perform the control condition on the WS Spelling Sounds ($F = 1.54, p = .225$) or WS Spelling Words ($F = 1.91, p = .177$) measures. Although there were no statistically significant differences, students in the *Write Sounds* treatment condition

Table 12
ANCOVA Analyses of Spelling Measures

Source	SS	MS	df	F	<i>p</i>	η^2
WS Spelling Sounds Post						
Corrected Model	.90	.45	2	1.20	.314	.07
Intercept	48.69	48.69	1	130.847	.000	.81
WS Spell Sound Pre	.35	.35	1	.94	.340	.03
Group	.57	.57	1	1.54	.225	.05
Error	11.16	.37	30			
Total	3154.00		33			
Corrected Total	12.06		32			
WS Spelling Words Post						
Corrected Model	10.70	5.35	2	1.54	.232	.09
Intercept	101.73	101.73	1	29.17	.000	.49
WS Spell Words Pre	4.18	4.18	1	1.20	.282	.04
Group	6.66	6.66	1	1.91	.177	.06
Error	104.63	3.49	30			
Total	8919.00		33			
Corrected Total	115.33		32			

Note. WS = *Write Sounds* researcher-created measure; HW = Handwriting; Leg = Legibility; THS-R = Test of Handwriting Skills-Revised.

scored, on average, 0.26 of a point higher on the WS Spelling Sounds measure than students in the BAU control group. After controlling for pretest effects, the WS Spelling Sounds posttest measure effect size was $g = 0.41_{ns}$, 95% *CI* [-0.28, 1.11]. Students in the *Write Sounds* treatment condition also scored, on average, 0.88 of a point higher on the WS Spelling Words measure than students in the BAU control group. After controlling for pretest effects, the WS Spelling Words posttest measure effect size was $g = 0.47_{ns}$, 95% *CI* [-0.22, 1.16].

CHAPTER 5

Discussion

The purpose of the *Write Sounds* intervention was to provide reciprocal benefits by teaching phonics and handwriting in an integrated approach for students with word-level reading and handwriting difficulties (Ehri, 2005; Graham et al., 2017). A previous exploratory pilot study provided support for the instructional sequence, instructional materials, and feasibility of the lesson components. However, the exploratory study did not examine the promise or efficacy of the intervention.

The purpose of the current study was to examine the promise of the intervention on handwriting, spelling, and sentence-level writing skills of second- and third-grade students with word-level reading and spelling as well as handwriting difficulties as compared to BAU literacy instruction as well as the usability and feasibility of the complete *Write Sounds* intervention. Unfortunately, the study was cut short due to the COVID-19 pandemic, and subsequent closure of all the schools for the remainder of the school year. Therefore, the treatment group did not receive the entire intervention as planned, and the outcome measures were not completed. However, the program's Mastery Check 1 formative assessment was used as a proxy for posttest measures to evaluate the impact of the portion of the intervention that was completed.

Usability and Feasibility of *Write Sounds*

The study provided positive results on the usability and feasibility of the intervention. Conclusions drawn from the usability and feasibility teacher questionnaire are reduced due to the lack of teacher participation. However, although only two of the nine teachers responded to the questionnaire, they had a combined 17 years of teaching

experience. They also had experience in multiple grade levels, which provides a more balanced perspective.

The teachers generally responded favorably to the intervention materials, including the teacher manual, student response book, and spiral fluency notebook. They agreed with the instructional content in the intervention, especially the integration of phonics and handwriting through contextual practice. Integration is one of the distinguishing features of the *Write Sounds* intervention, so it is promising that the classroom teachers felt so strongly about it.

In addition to the questionnaire, I measured feasibility of the intervention through fidelity and dosage. The intervention instructor delivered the intervention with a high degree of fidelity (99.6%). The high fidelity obtained supports the teachers' feedback that the instructional materials were supportive and clear as the instructor was able to teach the components consistently. However, when I calculated the fidelity score on total lesson components delivered in the session, not just those delivered in the session, fidelity dropped to 94.9 %. Therefore, time constraints impacted the completion of some of the lesson components and it is important to look more deeply at dosage of the intervention.

The dosage results were promising, with 81% of the activities completed. However, taking into consideration that the intervention was implemented by its developer and less than 90% of the activities were completed, it may be even more difficult for another instructor to complete the activities in the allotted time. For example, the fluency training component was not delivered to any group due to time constraints. This component was developed to increase letter automaticity and transfer the

handwriting skills to traditional notebook paper, so it is crucial for struggling students. Therefore, it seems that the 15-min time allotted for the cumulative review lessons was insufficient. However, the fluency component does not begin until lesson 6, and the intervention stopped at lesson 10, allowing for only three opportunities for instruction.

In many cases, when the lessons were not completed, other outside factors contributed to the incompleteness of the lessons. These lessons occurred primarily during the last two weeks of the study when there was significant uncertainty surrounding the COVID-19 pandemic. The schools, teachers, and students experienced tremendous amounts of stress, and minimal leeway was given in terms of time for the intervention lessons. Several lessons were rushed because the teachers or principals needed the student to complete a more pressing task.

Promise of Write Sounds

Berninger & Wolf (2009) found that if working memory was overloaded (e.g., letter formation uncertainty) students would have more difficulty efficiently coordinating the phonological and orthographic code needed for written communication. The significant correlations found between the WS Spelling Words pretest and all three handwriting pretest measures, THS-R Frog, THS-R Lion, and WS Overall Legibility provided support for those findings. The more accurate letter formation correlated with the ability to spell words. Additionally, the significant correlation found between THS-R Frog and WS Overall Legibility showed that students with handwriting accuracy had more legible writing overall. Based on previous research, phonemic awareness is a foundational literacy skill and deficits in phonemic awareness lead to difficulty connecting corresponding graphemes and phonemes (Berninger & O'Malley-May, 2011;

Brooks et al., 2011; Ehri, Nunes, Willows et al., 2001; Frost et al., 2009; Graham & Hebert, 2010, 2011; Sanders et al., 2018). Thus, it was surprising that the phonemic awareness measure (i.e., CTOPP-2 Segmenting subtest) was not correlated with any of the measures. One reason may be that the mean standard score on this measure was below 85 for both groups. This means that the students were more than one standard deviation below the mean (i.e., below the 16th percentile). Therefore, we have a truncated range of scores and possibly not enough variability to correlate with any of the measures.

The ANCOVA analyses indicated that the intervention had statistically significant effects related to all handwriting outcomes. The *Write Sounds* treatment had moderate to large effects on researcher-created proximal measures of students' handwriting accuracy when writing individual letters ($ES = 0.76$), writing words ($ES = 0.91$), and overall legibility ($ES = 0.86$). Although the study was underpowered, all three of the handwriting effect sizes were statistically significant. Moreover, the handwriting measures used at posttest required the student to write the letter based on a dictated sound instead of writing from the dictated letter name, which is a more complex skill. Therefore, not only did the students form the letters with a higher degree of accuracy, they did so while processing the phoneme-grapheme correspondence. These positive results are promising, considering that the students did not complete the entire intervention, but, it is also important to contextualize the findings. The students in the treatment group made small overall average gains, ranging from writing a little over one letter to around seven letters more on the measures. Previous literature in handwriting instruction provided some context for the interpretation of the results. In a study by Graham and colleagues (2000), 36 first-grade students were randomly assigned to either the multi-component

handwriting treatment condition or the phonological awareness intervention control condition. The treatment intervention included 27 lessons that were 15 mins in duration. The researchers delivered the complete intervention from February to May with a total of 405 mins of instruction. The results indicated that the treatment group outperformed the control group by an average of 4.63 letters and the effect size was $g = 1.05$, 95% *CI* [0.35, 1.75]. Another study by Denton and colleagues (2006), 24 first-grade through fifth-grade students were randomly assigned to a multi-component handwriting treatment condition or BAU control group. The treatment intervention included 30 min handwriting instructional sessions delivered four times per week for five weeks for a total of 600 mins of instruction. The results indicated that the treatment group outperformed the control group by an average of 10.04 letters and the effect size was $g = 0.67$, 95% *CI* [-0.18, 1.52].

The current study results were comparable to Graham et al. (2000) and Denton et al. (2006) despite the fact that the *Write Sounds* treatment group did not complete the intervention and instead included an average of 10 lessons that were 15 minutes in duration for a total of 115 mins of instruction. The gains on the *Write Sounds* handwriting measures ranged from 1.29 to 6.85 letters as compared to the 4.63 to 10.04 letters found in the Denton et al., (2006) and Graham et al. (2000) studies. The results are promising considering the *Write Sounds* treatment group received around 71 to 81 percent fewer instructional minutes, which included 400 and 600 mins of instruction, respectively. Thus, the effect sizes found for the handwriting measures seem to be educationally meaningful and align with prior research findings.

Although there were statistically significant increases in handwriting accuracy, there were no statistically significant differences between groups on the spelling measures. Still, the treatment group scored slightly higher than the control group on both of the spelling measures. Nonetheless, the *Write Sounds* intervention resulted in small to moderate underpowered effect sizes on researcher-created proximal measures of Spelling Sounds ($ES = 0.41$ *ns*) and Spelling Words ($ES = 0.47$ *ns*). The expectation was that a increase in handwriting accuracy would reduce students' working memory load, freeing up working memory resources to spell words more successfully. However, because the students were not able to complete the entire intervention, they completed only 11 of the 27 lessons (less than 50%), and the instructor could not implement all of the lesson components for each lesson due to time constraints. This is an important point of discussion, as the intervention was sequential and cumulative with the more advanced concepts introduced in the later lessons. Some of the participants in this study had deficits in the beginning concepts (i.e., short vowel sounds, single consonant sounds). However, a majority of the students had deficits in the advanced concepts (i.e., long-vowel sounds, digraphs, diphthongs). These more complex concepts were planned to begin in lesson 19 of the *Write Sounds* intervention. Therefore, the students received handwriting instruction in most of the letters but did not receive the related phonics instruction of the more complex graphemes (e.g., e-e, ay, sh), which could have impacted the students' gains in the spelling measures.

The students also did not receive the designed amount of repeated practice by not completing the entire intervention. Repeated practice is a critical component to developing automaticity (Kubina & Morrison, 2000; Logan, 1997), and without the

fluency measure, it is unlikely that the intervention could have resulted in automatic letter formation. Therefore, it is possible that completing the intervention may still improve students' spelling outcomes and strengthen handwriting outcomes. Further research on the *Write Sounds* intervention is warranted.

Limitations and Recommendations for Future Research

Several factors limit the conclusions that can be drawn from this study. First and most obvious, the worldwide COVID-19 pandemic forced the closure of all schools and suspension of all in-person research. All the participating schools closed abruptly and initially thought students would return before the end of the school year. The abrupt nature of the closing and uncertainty in returning to campus made completing the original study impossible. Therefore, the treatment group completed approximately 40% of the intervention (i.e., 11 of the 27 lessons and 1 of the four mastery checks). It is possible that the participants would have benefited from the more complex concepts in the later lessons that were not completed. It was impossible to administer the posttests as planned. Instead, the first mastery check served as a proxy. The WS Mastery Check did not assess handwriting fluency or decoding skills. Subsequently those skills were not assessed as designed and no conclusions could be drawn regarding effectiveness of the intervention in those areas. Moreover, the majority of the classroom teachers, approximately 80%, were unable to complete the usability and feasibility questionnaire, making it difficult to make a strong statement about the intervention. Future research implementing the entire intervention as designed is needed to determine the effectiveness of the intervention.

Second, the intervention was implemented with a single instructor for all groups. The instructor had over 15 years of experience teaching children with learning disabilities

and was also a developer of the intervention. Therefore, there are potential teacher effects. It is uncertain if the intervention would be successful with an instructor that is unfamiliar with the intervention or does not have previous teaching experience. On the other hand, including a single teacher allowed the evaluation of the optimal delivery of the intervention. That said, future research should examine the impacts of the intervention as provided by multiple instructors.

Third, the results are limited due to the size and homogeneity of the sample. All the participants were recruited from parochial schools located in the Midwest. Also, the students were limited to enrollment in second or third grade. Thus, the learning environment, curriculum, and demographic characteristics of the students and teachers may not generalize to other more diverse settings. For example, with a larger sample, researchers may be able to examine possible grade-level effects.

Conclusions

Due to the worldwide COVID-19 pandemic and the closure of schools for the remainder of the year, the intervention was not completed in its entirety, and the posttests were not administered as designed. Although the research questions regarding students' growth in handwriting fluency or the transfer of decoding skills were not answered in this study, we were able to assess handwriting accuracy in isolation and context as well as phonics skills through spelling sounds and spelling phonetically regular words. The effect sizes obtained on the posttest measures showed effects ranging from 0.41 to 0.91. Furthermore, data gathered on the usability and feasibility of the intervention provide information to guide future iterations of the *Write Sounds* intervention. This study suggests that the *Write Sounds* intervention shows promise for impacting handwriting and

spelling outcomes for students with handwriting and word-level reading difficulties.

Based on the promising results found in this study, additional study on this intervention is warranted.

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APPENDIX A

STUDY INFORMATION SCRIPT

APPROVAL LETTER

PARENT/LEGAL GUARDIAN INFORMED CONSENT & STUDENT

DEMOGRAPHIC SURVEY

TEACHER INFORMED CONSENT

STUDENT ASSENT

STUDY INFORMATION SCRIPT

Initial phone call or email script

Dear _____ (insert parent/guardian's name),

Good afternoon. My name is Pam Bazis and I am a doctoral student at the University of Nebraska-Lincoln. I am currently working on a research study that provides handwriting and phonics instruction to students that are having difficulty with handwriting and reading. Your child has been nominated by their classroom teacher as a student who could benefit from additional handwriting and phonics instruction.

If you think you may be interested in participating, I would like to set up a time to meet with you to share the details about the study as well as answer any questions you may have about your child's possible participation in the study.

Sincerely,
Pam Bazis

APPROVAL LETTER



Official Approval Letter for IRB project #19995 - New Project Form

December 19, 2019

Pamela Bazis
Department of Special Education and Communication Disorders
BKC 343 UNL NE 685830738

Michael Hebert
Department of Special Education and Communication Disorders
BKC 318Q UNL NE 685830738

IRB Number: 20191219995EX
Project ID: 19995
Project Title: Write Sounds Program to Improve Handwriting and Phonics

Dear Pamela:

This letter is to officially notify you of the certification of exemption of your project for the Protection of Human Subjects. Your proposal is in compliance with this institution's Federal Wide Assurance 00002258 and the DHHS Regulations for the Protection of Human Subjects at 45 CFR 46 2018 Requirements and has been classified as exempt. Exempt categories are listed within HRPP Policy #4.001: Exempt Research available at: <http://research.unl.edu/researchcompliance/policies-procedures/>.

- o Date of Final Exemption: 12/19/2019
- o Review conducted using exempt category 1 at 45 CFR 46.104
- o Funding (Grant congruency, OSP Project/Form ID and Funding Sponsor Award Number, if applicable): N/A

You are authorized to implement this study as of the Date of Final Approval: 12/19/2019.

Note: Section 7.6 of the protocol indicates that consent will be translated to other languages for parents if needed. If translations are needed, the translated document along with the translation certification form found on our website here <https://research.unl.edu/researchcompliance/templates-forms/>, will need to be submitted via a Change Request Form in NUgrant before they can be used in the research.

We wish to remind you that the principal investigator is responsible for reporting to this Board any of the following events within 48 hours of the event:

- * Any serious event (including on-site and off-site adverse events, injuries, side effects, deaths, or other problems) which in the opinion of the local investigator was unanticipated, involved risk to subjects or others, and was possibly related to the research procedures;
- * Any serious accidental or unintentional change to the IRB-approved protocol that involves risk or has the potential to recur;
- * Any protocol violation or protocol deviation
- * An incarceration of a research participant in a protocol that was not approved to include prisoners
- * Any knowledge of adverse audits or enforcement actions required by Sponsors
- * Any publication in the literature, safety monitoring report, interim result or other finding that indicates an unexpected change to the risk/benefit ratio of the research;
- * Any breach in confidentiality or compromise in data privacy related to the subject or others; or
- * Any complaint of a subject that indicates an unanticipated risk or that cannot be resolved by the research staff.

This project should be conducted in full accordance with all applicable sections of the IRB Guidelines and you should notify the IRB immediately of any proposed changes that may affect the exempt status of your research project. You should report any unanticipated problems involving risks to the participants or others to the Board.

If you have any questions, please contact the IRB office at 402-472-6965.

Sincerely,

Jenn Klein
for the IRB



PARENT/LEGAL GUARDIAN INFORMED CONSENT & STUDENT DEMOGRAPHIC SURVEY



IRB #: 19995

Formal Study Title:

Write Sounds Program to Improve Handwriting and Phonics

Principal Investigators:

Pamela Bazis	Cell: (972) 814-7987	Email: pbazis@huskers.unl.edu
Michael Hebert, Ph.D.	Office: (402) 472-3307	Email: michael.hebert@unl.edu

Key Information:

Your child is invited to take part in a research project (see invitation below). If you agree that your child/legal ward may participate in the study, the project will involve:

- Students experiencing difficulty with handwriting in grades 2, 3, & 4
- Procedures will include:
 - Parents/Guardians will complete a child information sheet
 - Students will complete a handwriting screening test (5 min)
 - Students will be randomly assigned to get (a) **handwriting and phonics**—reading—instruction or (b) **regular instruction** in their classrooms
 - All students will complete pretest assessments of handwriting, spelling, and reading (17-25 minutes total)
 - Students in the **handwriting and phonics** group will receive small group instruction in handwriting and reading instruction for 15 minutes a day for 35 lessons.
 - After the 35 lessons, all students will complete posttest assessments of handwriting, spelling, and reading (15-27 minutes total)
 - Students in the **regular instruction** group will continue to work with their teachers during the 35 lessons, but will receive the handwriting and reading instruction after the post-testing is complete.
- The study will take approximately 9.6 hours total
- All activities will take place at the school your child attends
- There are no risks associated with this study
- You and your child will be provided a copy of the consent and assent forms

Invitation

You and your child are invited to take part in this research study! Researchers at the University of Nebraska-Lincoln are conducting this study. The information in this form is meant to help you decide whether or not you and your child will participate. If you have any questions, please ask during our meeting, or contact Pam Bazis (pbazis@huskers.unl.edu).



Department of Special Education and Communication Disorders
301 Barkley Memorial Center | P.O. Box 830738 | Lincoln, NE 68583-0738 | 402.472.2145 | Fax 402.472.7697
cehs.unl.edu/secd

Why are you and your child being asked to be in this research study?

Your child/legal ward is being asked to be in this study because he/she was nominated by the classroom teacher as a student who could benefit from additional handwriting and phonics instruction. They must be in grade 2, 3, or 4, and score below the 25th percentile on a handwriting test to participate. If you agree, we will give your child a 5-10 minute handwriting test to determine if they qualify. If so, they will participate in the rest of the study. If not, we will let you know that your child does not qualify for the study and may not need handwriting support. In that case, we will only use your child's de-identified data for comparison purposes.

What is the reason for doing this research study?

This research is designed to determine if the "Write Sounds" handwriting & phonics program can be used to improve students' handwriting and reading skills. The study compares the "Write Sounds" program to regular classroom instruction.

What will be done during this research study?

We first ask you to fill out a short information sheet at the end of this consent form. Your child/legal ward will be asked to complete a handwriting screening test (5-10 minutes). On a separate day, they will take 2 more handwriting tests (2 minutes), a word-sounds test (1-5 minutes), 2 reading tests (2-8 minutes), and a spelling test (10 minutes).

After the initial testing, your child will either:

- (a) participate in 35 handwriting and phonics lessons (15 minutes each). The lessons will occur over a 9-week period.
- or
- (b) participate in their regular classroom instruction [these kids will get the handwriting and phonics instruction after the study is complete].

After the instruction, your child will be asked to take 1 handwriting test (1 minute), a word-sounds test (1-5 minutes), 2 reading tests (5-11 minutes), and a spelling test (10 minutes).

All assessments and instruction will take place at the school in which your child is enrolled and will take a total of approximately 9.6 hours.

What are the possible risks of being in this research study?

There are no known risks to you or your child as a result of being in this research study.

What are the possible benefits to you and your [child/legal] ward?

By participating in this study, your child may benefit from additional handwriting and phonics instruction by increasing their skills and confidence in handwriting, spelling, and reading skills.

What are the possible benefits to other people?

The results of this study may help researchers and teachers understand how to better teach handwriting and phonics for children having difficulties.

What are the alternatives to being in this research study?

Instead of being in this research study, you can choose not to allow your child to participate.

What will being in this research study cost you or your [child/legal ward]?

There is no cost to you or your child to be in this research study.

Will you or your child be compensated for being in this research study?

Your child will not receive any financial compensation for their participation in this study.

What should you do if you or your child has a problem during this research study?

Your welfare and your child's welfare is the major concern of every member of the research team. If there is a problem as a direct result of being in this study, you should immediately contact one of the principal investigators listed at the beginning of this consent form.

How will information about you and your child be protected?

Reasonable steps will be taken to protect the privacy and the confidentiality of your study data. Your child will be given a unique identification number for this study. When we collect information about your child, we will replace his or her name with the identification number. When the study is complete, any documents linking the identification number to your child's real name will be destroyed.

We will store copies of your child's writing data (without names) in a locked cabinet in the investigator's office. We will keep audio recordings of your child reading letters and words on a secure server at the University of Nebraska-Lincoln; your child's name will not be on the recordings. All of your child's individual writing and reading scores will be seen only by the research team during the study. We will keep the data without your child's name, indefinitely.

The only persons who will have access to you and your child's research records during the data collection phases are the study personnel, the Institutional Review Board (IRB), and any other person, agency, or sponsor as required by law or contract. The information from this study may be published in a dissertation, scientific journals, and at scientific meetings, but the data will be reported as group or summarized data, and your child's identity will be kept strictly confidential.

After the study is completed and published, we will make the dataset available by request from other researchers in a data repository at the University of Nebraska—Lincoln. However, that data set will *NOT* include your child's name, examples of their writing, or any audio recordings we have that include their voices.

We will send a hard copy of your child's scores to you in the mail, along with an explanation of the scores, and we will make ourselves available to answer any questions you may have. Finally, we will share the results of your child's tests with your child's teacher.

What are you and your child's rights as a research subject?

You and your child may ask any questions concerning this research and have those questions answered before agreeing to participate in or during the study.

For study related questions, please contact the investigator(s) listed at the beginning of this form. For questions concerning your rights or complaints about the research contact the Institutional Review Board (IRB):

- Phone: 1(402)472-6965
- Email: irb@unl.edu

What will happen if you decide not to be in this research study or decide you and your child need to stop participating once starting?

You can decide you and your child should not be in this research study, or you can stop being in this research study ("withdraw") at any time before, during, or after the research begins for any reason. Deciding not to allow your child to participate in this research study or deciding to withdraw will not affect you or your child's relationship with the University of Nebraska-Lincoln or your child's school. You and your child will not lose any benefits to which you are entitled.

Documentation of informed consent

You are voluntarily making a decision whether or not to participate in this research study. Signing this form means that (1) you have read and understood this consent form, (2) you have had the consent form explained to you, (3) you have had your questions answered and (4) you have decided that you and your child will participate in this research study. You will be given a copy of this consent form to keep.

Participant Feedback Survey

The University of Nebraska-Lincoln wants to know about your research experience. This 14-question, multiple-choice survey is anonymous. This survey should be completed after your participation in this research. Please complete this optional online survey at: <http://bit.ly/UNLresearchfeedback>.

IRB #: 19995

Formal Study Title:

Write Sounds Program to Improve Handwriting and Phonics

If you are interested in participating and having your child participate in this study, please fill out the information requested on this page.

Name of Child to be included:

(Name of Child: Please print)

Child's Date of Birth

Parent/Legal Guardian Name:

(Name of Parent/Legal Guardian: Please print)

Parent/Legal Guardian Signature:

Signature of Parent/Legal Guardian

Date

Please provide the following information so that we can contact you regarding the results of this study:

Child's name: _____

Address _____

E-mail address _____

Phone Number _____

(researchers will cut off top portion after adding the participant's study identification number)

Parent Survey

As part of the study we will be summarizing demographic information about our participants. No personal or identifiable information will be shared, as we will only report aggregate data. Thank you.

1. Grade _____

2. Gender _____ Male _____ Female

3. Birth Date: _____

4. Primary Language: _____

5. Does the student qualify for Free or Reduced Lunch? _____ YES _____ NO

6. Does the student have a Special Education IEP? _____ YES _____ NO

If yes, what is the disability category listed on the IEP? _____

7. Ethnicity (check all that apply)

_____ African American

_____ Asian

_____ Caucasian

_____ Hispanic

_____ Hawaiian/Pacific Islander

_____ Native American

_____ Other (Please Specify) _____

[For use by study personnel]
Participant Study ID Number:

TEACHER INFORMED CONSENT



IRB #: 19995

Formal Study Title:

Write Sounds Program to Improve Handwriting and Phonics

Principal Investigators:

Pamela Bazis	Cell: (972) 814-7987	Email: pbazis@huskers.unl.edu
Michael Hebert, Ph.D.	Office: (402) 472-3307	Email: michael.hebert@unl.edu

Key Information:

If you agree to participate in the study, the project will involve:

- Reviewing the "Write Sounds" intervention instructional materials (approx. 15 minutes)
- Completing a Usability and Feasibility Questionnaire
 - 6 demographic questions about your teaching backgrounds (1-3 minutes)
 - 16 questions about the program (approx. 5-10 minutes)

Invitation

You are invited to take part in this research study. Researchers at the University of Nebraska-Lincoln are conducting this study. The information in this form is meant to help you decide whether or not you will participate. If you have any questions, please ask during our meeting, or contact Pam Bazis (pbazis@huskers.unl.edu).

Why are you being asked to be in this research study?

You are being asked to be in this study because you are a second, third, or fourth grade classroom teacher in a Lincoln area Catholic school.

What is the reason for doing this research study?

This research is designed to determine if "Write Sounds" handwriting & phonics program can be used to improve students' handwriting and reading skills. The study compares the "Write Sounds" program to regular classroom instruction.

What will be done during this research study?

You will be asked to examine the "Write Sounds" intervention materials and provide constructive feedback. In order to provide the feedback, you will be asked to complete a questionnaire that will include 6 questions about your teaching background and 16 questions on the intervention materials and structure. You will also be asked to describe your classroom instruction during the time the students in the treatment group are receiving small group

instruction. We expect that you will need approximately 15 minutes to review the materials and around 10 minutes to fill out the questionnaire.

How will my data be used?

Your data will be de-identified and the results calculated for each question as a group. The information may be presented in a dissertation, scientific journal, or conference presentation.

What are the possible risks of being in this research study?

There are no known risks to you as a result of being in this research study.

What are the possible benefits to you?

By participating in this study, you may benefit from having access to the "Write Sounds" instructional materials. However, you may not get any benefits from being in this research study.

What are the possible benefits to other people?

The results of this study may help researchers and teachers understand how to better teach handwriting and phonics for children having difficulties.

What are the alternatives to being in this research study?

Instead of being in this research study, you can choose not to participate.

What will being in this research study cost you?

There is no cost to you to be in this research study.

Will you be compensated for being in this research study?

You will not receive any financial compensation for your participation in this study.

What should you do if you have a problem during this research study?

Your welfare is the major concern of every member of the research team. If there is a problem as a direct result of being in this study, you should immediately contact one of the principal investigators listed at the beginning of this consent form.

How will information about you be protected?

Reasonable steps will be taken to protect the privacy and the confidentiality of your study data. You will be given a unique identification number for this study. When we collect information, we will replace your name with the identification number within 1-week. When the study is complete, any documents linking the identification number to your real name will be destroyed.

We will store copies of your questionnaires (without names) in a locked cabinet in the investigator's office. The questionnaires will only be seen by the research team during the study. We will keep the data, without your name, indefinitely.

The only persons who will have access to your research records are the study personnel, the Institutional Review Board (IRB), and any other person, agency, or sponsor as required by law or contract. The information from this study may be published in a dissertation, scientific journals,

and at scientific meetings, but the data will be reported as group or summarized data, and your identify will be kept strictly confidential.

What are your rights as a research subject?

You may ask any questions concerning this research and have those questions answered before agreeing to participate in or during the study.

For study related questions, please contact the investigator(s) listed at the beginning of this form.

For questions concerning your rights or complaints about the research contact the Institutional Review Board (IRB):

- Phone: 1(402)472-6965
- Email: irb@unl.edu

What will happen if you decide not to be in this research study or decide to stop participating once you start?

You can decide not be in this research study, or you can stop being in this research study ("withdraw") at any time before, during, or after the research begins for any reason. Deciding not to be in this research study or deciding to withdraw will not affect your relationship with the University of Nebraska-Lincoln or your school.

You will not lose any benefits to which you are entitled.

Documentation of informed consent

You are voluntarily making a decision whether or not to participate in this research study. Signing this form means that (1) you have read and understood this consent form, (2) you have had the consent form explained to you, (3) you have had your questions answered and (4) you have decided that you and your child will participate in this research study. You will be given a copy of this consent form to keep.

Participant Feedback Survey

The University of Nebraska-Lincoln wants to know about your research experience. This 14 question, multiple-choice survey is anonymous. This survey should be completed after your participation in this research. Please complete this optional online survey at: <http://bit.ly/UNLresearchfeedback>.

If you are interested in participating in this study, please fill out the information requested on this page:

Participant Name:

(Name of Participant: Please print)

Participant Signature:

Signature of Participant

Date

STUDENT ASSENT



IRB #: 19995

Formal Study Title:

Write Sounds Program to Improve Handwriting and Phonics

Principal Investigators:

Pamela Bazis

Cell: (972) 814-7987

Email: pbazis@huskers.unl.edu

Michael Hebert, Ph.D.

Office: (402) 472-3307

Email: michael.hebert@unl.edu

Child Assent Script for Testing

Hi, _____ (children's names), my name is _____ (researcher's name). We are going to be working together for the next few months. We will be working on some new activities to teach handwriting, reading, and spelling together. You will be a big part in helping me see how well the activities work. Each day, we will work for about 15 minutes. If you have trouble with any of the activities, don't worry, I will be there to help you.

Your parents have already given permission for you to work with us, but we wanted to get permission from you as well. You do not have to participate, and you can stop at any time. Does this sound like something you would like to help us with?

If YES, _____

Signature of the Researcher



Department of Special Education and Communication Disorders
301 Barkley Memorial Center | P.O. Box 830738 | Lincoln, NE 68583-0738 | 402.472.2145 | Fax 402.472.7697
cehs.unl.edu/secd

APPENDIX B

RESEARCHER-CREATED MEASURES

USABILITY & FEASIBILITY QUESTIONNAIRE

***WRITE SOUNDS* MASTERY CHECK ASSESSMENTS**

PSEUDOWORD DECODING MEASURE

***WRITE SOUNDS* SUMMATIVE ASSESSMENT**

Write Sounds Usability and Feasibility Questionnaire

Teacher Name: _____

School: _____ Date: _____

The "Write Sounds" Program Usability and Feasibility Questionnaire					
	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
	(1)	(2)	(3)	(4)	(5)
1. The program duration of 36 sessions is appropriate.					
Comments:					
2. The pace of grapheme instruction (multiple letters per lesson) was appropriate.					
Comments:					
3. Fifteen min is a sufficient amount to time to complete each lesson.					
Comments:					
4. The lesson structure of A-day and B-day provides a good balance and distribution of activities.					
Comments:					
5. The dictated words were an appropriate level of difficulty.					
Comments:					
6. The fluency training component using notebook					

paper helped the students transfer handwriting skills.					
Comments:					
	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
	(1)	(2)	(3)	(4)	(5)
7. The program is appropriate for second grade students with handwriting difficulties.					
Comments:					
8. The program is appropriate for third grade students with handwriting difficulties.					
Comments:					
9. The soft script/directions included in the teacher manual are clear.					
Comments:					
10. The soft script/directions included in the teacher manual proved enough guidance for me to use the program easily.					
Comments:					
11. The activities in the student response book are clear.					
Comments:					
12. The student response book includes sufficient					

opportunities for repeated practice.					
Comments:					
	Strongly Disagree (1)	Disagree (2)	Undecided (3)	Agree (4)	Strongly Agree (5)
13. The way the program combines handwriting and phonics would be beneficial for my struggling students.					
Comments:					
14. This program has all of the components I would look for in a handwriting program.					
Comments:					
15. I would you use this program with my students.					
Comments:					
16. Describe the instruction that took place in your classroom when the students in the intervention group were pulled out for instruction.					

Write Sounds Mastery Check Assessments

Name:		Grade:
Mastery Check #1		Date:
Stimulus	Teacher	Results
l, i, o, a, d, b, g, c, t, p	Dictate graphemes one at a time & Circle grapheme(s) formed incorrectly	___ / 10 graphemes ___ % correctly formed
A big cat got it to dot a lot.	Dictate sentence & Circle words formed incorrectly	___ / 9 words ___ % correctly spelled
Comments:		
Mastery Check #2		Date:
Stimulus	Teacher	Results
i, o, a, b, m, n, j, s, l, c, d, p, u, h, f, e, t, t, r, er	Dictate graphemes one at a time & Circle grapheme(s) formed incorrectly	___ / 20 graphemes ___ % correctly formed
A rabbit jumped in a hot tent.	Dictate sentence & Circle words formed incorrectly	___ / 7 words ___ % correctly spelled
Comments:		
Mastery Check #3		Date:
Stimulus	Teacher	Results
i, o, a, b, m, n, j, s, v, k, q, th, l, c, d, p, u, h, f, e, w, y, ch, t, g, r, er, x, z, sh	Dictate graphemes one at a time & Circle grapheme(s) formed incorrectly	___ / 30 graphemes ___ % correctly formed
On Sunday the children went to the picnic.	Dictate sentence & Circle words formed incorrectly	___ / 7 words ___ % correctly spelled
Comments:		

Pseudo-word Decoding Measure

Teacher Recording Form			
Pseudo-word	Student Response	Pseudo-word	Student Response
1) fip		16) lang	
2) yev		17) wock	
3) lan		18) rish	
4) bim		19) peth	
5) dut		20) sone	
6) sloz		21) fute	
7) dran		22) rike	
8) smed		23) wele	
9) rast		24) yave	
10) lisk		25) heesh	
11) tulp		26) petniz	
12) brock		27) sopteck	
13) shem		28) uptish	
14) chish		29) mitach	
15) thust		30) hamdug	
		Total Words Correctly Read	_____/30

Student Stimulus Form

fip yev lan bim dut

sloz dran smed rast lisk

tulp brock shem chish thust

lang wock rish peth sone

fute rike wele yave heesh

petniz sopteck uptish mitach hamdug

Write Sounds Summative Assessment

ID:		Grade:
Pretest		Date:
Stimulus	Teacher	Notes
i, [k/c/ck], o, a, b, i-e, m, [ee/e-e], n, j, [o-e/oa], s, v, u-e, q, th, l, ng, d, p, wh, [a-e/ay/ai], u, h, f, e, oo, w, y, ch, t, g, r, er, x, z, sh	Say > I am going to say several sounds, one at a time, after I say the sound I want you to write the letter or letters that can make that sound. 1-Dictate each phoneme one at a time. Repeat as necessary	
You need to take those student athletes to the hospital before lunch.	Say > I am going to say a sentence, after I say the sentence I want you to write the sentence. You may not know how to spell all the words, just do the best you can. 1-Dictate the whole sentence 2-Have student repeat the sentence 3-Dictate the sentence again in phrases. Repeat as necessary.	
Posttest		Date:
Stimulus	Teacher	Notes
i, [k/c/ck], o, a, b, i-e, m, [ee/e-e], n, j, [o-e/oa], s, v, u-e, q, th, l, ng, d, p, wh, [a-e/ay/ai], u, h, f, e, oo, w, y, ch, t, g, r, er, x, z, sh	Say > I am going to say several sounds, one at a time, after I say the sound I want you to write the letter or letters that can make that sound. 1-Dictate each phoneme one at a time. Repeat as necessary	
You need to take those student athletes to the hospital before lunch.	Say > I am going to say a sentence, after I say the sentence I want you to write the sentence. You may not know how to spell all the words, just do the best you can. 1-Dictate the whole sentence 2-Have student repeat the sentence 3-Dictate the sentence again in phrases. Repeat as necessary.	

APPENDIX C

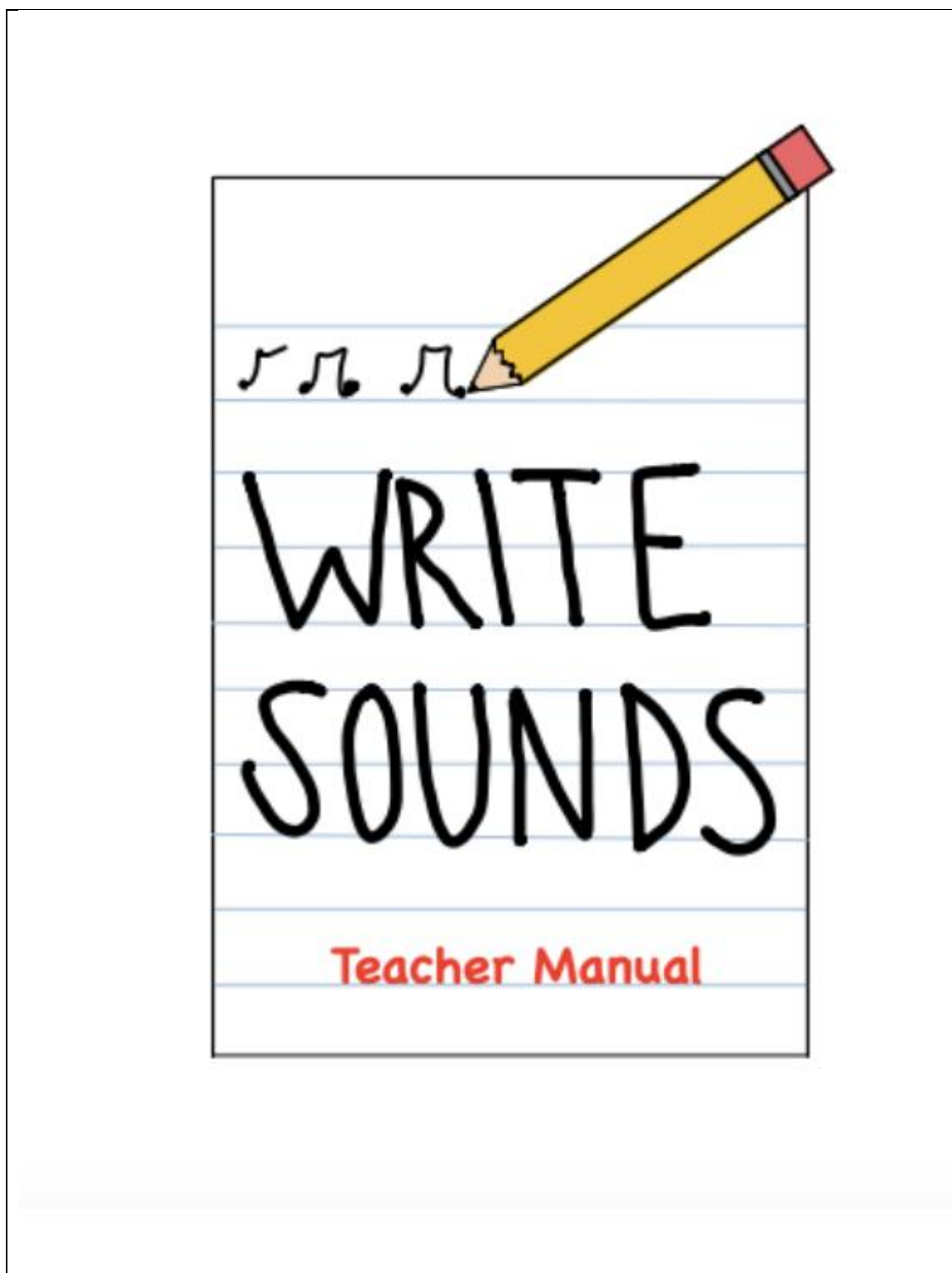
***WRITE SOUNDS* INSTRUCTIONAL MATERIALS**

***WRITE SOUNDS* SCOPE AND SEQUENCE**

***WRITE SOUNDS* TEACHER MANUAL**

***WRITE SOUNDS* STUDENT RESPONSE BOOK**

Write Sounds Scope and Sequence						
Lesson	Grapheme Sequence			Phoneme Sequence	Dictated Words	Sentence
Pre-Lesson	Letter formation types: small, tall, & falling			pencil grip	Motivation Chart & Fluency Graph	Overview of lesson structure and goals of Write Sounds
1	l	i	t	short (i), (l), (t)	it, lit, tilt	
2	o	c	-	short (o), (c)	lot, clot, lotic	
3	a	d	g	short (a), (d), (g)	got, cat, can't	got a dog
4	b	p	-	(b), (p)	big, bat, plot	A big dog got it.
Mastery Check 1: b, i, o, a, p, l, c, t, d, g						
5, 6	m	u	-	(m), short (u)	mat, lamp, but /got, camp, dump	A dog got a cat!
7, 8	n	h	r	(n), (h), (r)	hand, run, punt/ mint, runt, hunt	Did a dog dig up a plant?
9, 10	j	f	-	(j), (f)	frog, flag, job/ flip, flat, jump	The rabbit can jump and run.
11, 12	s	e	er	(s), (e), (er)	spent, stump, enter/ sudden, often, number	A sudden frost got the frog jumping!
Mastery Check 2: t, c, g, p, u, n, f, er, e, j, r, m, b, d, o, l, i, a, h, s						
13, 14	v	w	x	(v), (w), (ks)	next, seven, went/wind, visit, never	Never visit a pond with six frogs.
15, 16	k	y	z	(k), (y), (z)	yes, zest, risk/zipper, kitten, family,	Yes, the kitten went with the family.
17, 18	q	-	-	q & review	quit, quip, quill/ planet, different, interest	She will enter the contest on Sunday after the picnic.
19, 20	th	ch	sh	(th), (ch), (sh)	shot, with, chest/ children, think, shipment	Several children went after the shipment.
Mastery Check 3: v, k, th, w, y, ch, t, c, g, p, u, n, f, er, e, j, r, m, b, d, o, l, i, a, h, s, sh, z, x						
21, 22	ck	ng	wh	(ck), (ng), (wh)	seventh, when socket/ which, song, picket	When did mother stop checking on the kittens?
23, 24	a-e	i-e/ e-e	o-e/ u-e	long: (a), (i), (e), (o), (u)	quake, before, while/ those, compute, athlete	Five athletes ate before the game.
25, 26	ee	oa/oo	ay/ai	long (e), (a) & (oo)	stay, paint, sleep, coat, moon /float, teeth, stood, tail, play	The other three school coaches stayed until the game finished.
27	review any letters based on student needs				problem, present, student/ hospital, finish, bottom, interest	Winter is not the time for sleeping outside in a tent.



Getting started with *Write Sounds*

Instruction

Instruction is divided into 27 lessons with sets of letters based on common formation characteristics(strokes) and sound production. Each lesson is designed to be completed in 15-min sessions. There are “New Learning” lessons that follow a specific instructional sequence and there are “Cumulative Review” lessons follow a different instructional sequence. The sequence of each is described below:

New Learning Lesson Format:

1. Explicit Letter Stroke Instruction

Teacher will explicitly teach the correct letter formation stroke for each letter in the lesson; one letter at a time starting with the least difficult formation stroke and moving to the more difficult in that set of letters. Teacher will verbalize the corresponding letter sound while forming the letter. Direct the students to verbalize the letter sound while writing each letter and model the procedure on the white board. Draw the students’ attention to their student book and the visual cues (arrows) for each letter.

2. Guided Letter-Sound Practice

Students trace the letter on their student book using the directional arrows to visualize the stroke, while verbalizing the letter sound. Monitor closely to ensure correct letter formation technique. Students produce each letter using proper spacing across the entire line while simultaneously verbalizing the corresponding letter sound.

3. Independent Letter-Sound Practice

Students write the letter on their student book, while verbalizing the letter sound. Monitor closely to ensure correct letter formation technique. Students produce each letter without any visual supports (no tracing or directional arrows) using proper spacing across the entire line while simultaneously verbalizing the corresponding letter sound.

4. Repeat steps 1-3 for each new letter in the lesson

5. Dictated Random Letter-Sound Practice

Randomly call out the either the letter name or letter sound learned for the students to write without visual supports. Monitor closely to ensure correct letter formation technique and correct sound.

6. Letter-Sound Transfer

High frequency words have been chosen based on the frequency and letter introduction sequence. The teacher will dictate the first high frequency word from the lesson. The students will repeat the word orally and unblend the sounds of the word. Then they will write the word on the lines provided in the Letter-Sound Application section of their student book. Teacher will repeat the process for two more words. Starting in lesson 4 the teacher will dictate the sentence provided in the lesson in addition to the words.

Cumulative Lesson Format:**Review Letter Stroke Instruction & Independent Practice**

First the teacher quickly writes the set of letters from the A-day lesson on the white board, being sure to use correct letter formation and verbalize the corresponding letter sound. Students produce the letters in their student book, while verbalizing the letter sound. Monitor closely to ensure correct letter formation technique and sound production. Teacher provides instruction and feedback as necessary.

Dictate Random Letter-Sound Practice

Next the teacher dictates a set of learned letters or sounds and the students write the letters on the lines provided in their student books. The goal is repeated independent practice, there will be a suggested list of letters to dictate. Teacher can substitute letters that the students need extra practice. Upon completion have students self-monitor and circle each letter they feel follows the strokes, teacher will confirm and student can color in the notes on their Write Sounds chart.

Letter-Sound Transfer

The teacher will dictate the next 3 high frequency words (one word at a time) from the lesson. The students will repeat the word aloud and unblend the sounds then write the words on the lines provided in their student book. Upon completion have students self-monitor and draw a star next to the words they feel follow the strokes and spacing rules, teacher will confirm and student can color in the notes on their Write Sounds chart. Next the teacher will dictate the phrase or sentence provided in the lesson. The students will repeat the sentence aloud and then write the sentence on the lines provided in their student book.


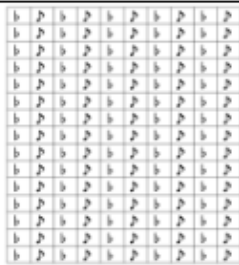
Fluency Training

The students will copy the sentence they created as many times as possible using the proper letter formation and line/spacing criteria, in a two- minute time period. Student will graph the number of correctly formed letters per minute on their fluency graph.











Sentence definition: A sentence expresses a complete thought, beginning with a capital letter and ending with some type of punctuation. Draw the sentence model when students are writing sentences for a visual reference.






Pre-Lesson

Introduction to “Write Sounds”		
Stimulus	Teacher	Student
Student Response Book	Pass out student books, explain lesson format of A-day, B-day	
Fluency Training Notebook (Wide Ruled Spiral Notebook)	Pass out spiral notebook, explain that we will be working on increasing our writing speed and accuracy of our writing on notebook paper each B-day.	
“Write Sounds” Graph	Pass our and explain that we will be keeping track of our correctly written letters per minute on our Fluency Graph. Keep the graph in the back of the Fluency Notebook.	
“Write Sounds” Chart	Pass out Self-Monitoring Chart, for each self-identified, correctly formed letter the students will color/stamp/x one of the notes.	
Pencil Grip		
3 Types of Letters		
Tall		
Small		
Falling		

Lesson 1







Letter Stroke Introduction & Practice		
Stimulus	Teacher	Student
	<p>Model letter formation & sound</p> <p>"start at the top; pull straight down"</p>	<div style="text-align: right; font-size: small;">Lesson 1A</div> <p style="font-size: x-small; margin: 0;">Letter Stroke Instruction Look at the new letter. Let's practice the stroke.</p> <div style="display: flex; align-items: center; margin: 5px 0;"> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">  </div> <div style="font-size: x-small; margin: 0;">start at the top, pull straight down</div> </div> <p style="font-size: x-small; margin: 0;">Letter-Sound Practice Trace each letter, while saying the sound of the letter. Write the letter across each line, while saying the sound. Be sure to use the proper letter formation.</p> <div style="margin-bottom: 10px;">  </div> <div>  </div> <p style="font-size: x-small; margin: 0;">Write the letter across each line, while saying the sound. Be sure to use the proper letter formation.</p>
	<p>Teach letter formation</p> <p>"start at the top; pull straight down"</p>	<p style="font-size: x-small; margin: 0;">Write the letter across each line, while saying the sound. Be sure to use the proper letter formation.</p>
	Observe & Guide in tracing	Trace & Say Sound
	Observe & Guide in writing	Write & Say Sound
	<p>Model letter (vowel) formation & sound</p> <p>"start at the mid-point; pull straight down, dot"</p>	<div style="text-align: right; font-size: small;">Lesson 1B</div> <p style="font-size: x-small; margin: 0;">Letter Stroke Instruction Look at the new letter. Let's practice the stroke.</p> <div style="display: flex; align-items: center; margin: 5px 0;"> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">  </div> <div style="font-size: x-small; margin: 0;">start at the mid-point, pull straight down & dot</div> </div> <p style="font-size: x-small; margin: 0;">Letter-Sound Practice Trace each letter, while saying the sound of the letter.</p> <div style="margin-bottom: 10px;">  </div> <div>  </div> <p style="font-size: x-small; margin: 0;">Write the letter across each line, while saying the sound. Be sure to use the proper letter formation.</p>
	<p>Teach letter formation</p>	<p style="font-size: x-small; margin: 0;">Write the letter across each line, while saying the sound. Be sure to use the proper letter formation.</p>
	Observe & Guide in tracing	Trace & Say Sound
	Observe & Guide in writing	Write & Say Sound

	<p>Model letter formation & sound</p> <p>"start at the top; pull straight down, cross above mid-point"</p>	<p>Letter Stroke Instruction Lesson 1A</p> <p>Look at the new letter; let's practice the stroke.</p>  <p>start at the top, pull straight down, cross just above mid-point</p> <p>Letter-Sound Practice</p> <p>Trace each letter, while saying the sound of the letter.</p> <p>t t t t t t t t t t</p> <p>t t t t t t t t t t</p> <p>t t t t t t t t t t</p> <p>Write the letter across each line, while saying the sound. Be sure to use the proper letter formation.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
	<p>Teach letter formation</p>	<p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
	<p>Observe & Guide in tracing</p>	<p>Trace & Say Sound</p>
	<p>Observe & Guide in writing</p>	<p>Write & Say Sound</p>
<p>l, l, t, t, l, l, l, t...</p>	<p>Dictate the new letter sounds</p> <p>Monitor while students write the letter that represents that sound.</p>	<p>Write & Say Sound</p> <p style="text-align: right;">Lesson 1A</p> <p>Listen carefully and write each of the letters, while saying the sounds on the lines below. Be sure to use proper strokes.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p>Letter-Sound Transfer</p>		
<p>it, lit, till</p>	<p>Teach the students that when a vowel is in a closed syllable the vowel will make the short vowel sound. VC, CVC, CVCC</p> <p>Dictate each word & Monitor</p>	<p>Say, Unblend, & Write</p> <p>Letter-Sound Transfer:</p> <p>Listen carefully to the words, then unblend and spell each one on the lines below. Be sure to use proper strokes.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>

Letter-Sound Transfer		
il, ill, tilit	Review closed syllable. Dictate each word, one at a time	Say word, Unblend, Write, Self-Assess & Color chart <i>Letter-Sound Transfer:</i> <i>Listen carefully to the words, then unblend and spell each one on the lines below. Be sure to use proper strokes. Put a star by your best words!</i> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
it <u>ill</u> tilit	Dictate phrase & Monitor student writing	Say phrase & Write <i>Listen carefully to the sentence, then unblend and spell the sentence on the lines below. Be sure to use proper strokes.</i> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Fluency Training		
it <u>ill</u> tilit	Write phrase at the top of each writing journal. Time for 2 minutes	Copy phrase for two minutes; count and graph letters per minute <i>Fluency Training:</i> <i>Grab your Handwriting Journal! Get ready to write!</i>





Lesson 3



Letter Stroke Introduction & Practice		
Stimulus	Teacher	Student
	<p>Model letter (vowel) formation & sound "start just below the mid-point, curve around left & close"</p>	<p><small>Letter Stroke Instruction:</small> Look at the new letter; let's practice the stroke.</p> <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-bottom: 10px;">  <div style="font-size: 8px; margin-left: 5px;"> start just below the mid-point, curve around left, close </div> </div> <p><small>Letter-Sound Practice:</small> Trace each letter; while saying the sound of the letter.</p> <p>o o o o o o o o o o o o o o</p> <p>o o o o o o o o o o o o o o</p> <p>o o o o o o o o o o o o o o</p> <p><small>Write the letter across each line, while saying the sound; be sure to use the proper letter formation.</small></p> <p>_____</p> <p>_____</p> <p>_____</p>
	<p>Teach letter formation</p>	
	<p>Observe & Guide in tracing</p>	
	<p>Observe & Guide in writing</p>	
	<p>Model letter formation & sound "start just below the mid-point; curve left, stop short"</p>	<p><small>Letter Stroke Instruction:</small> Look at the new letter; let's practice the stroke.</p> <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-bottom: 10px;">  <div style="font-size: 8px; margin-left: 5px;"> start just below the mid-point, curve around left, stop short </div> </div> <p><small>Letter-Sound Practice:</small> Trace each letter; while saying the sound of the letter.</p> <p>c c c c c c c c c c c c c c</p> <p>c c c c c c c c c c c c c c</p> <p>c c c c c c c c c c c c c c</p> <p><small>Write the letter across each line, while saying the sound; be sure to use the proper letter formation.</small></p> <p>_____</p> <p>_____</p> <p>_____</p>
	<p>Teach letter formation</p>	
	<p>Observe & Guide in tracing</p>	
	<p>Observe & Guide in writing</p>	


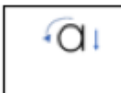
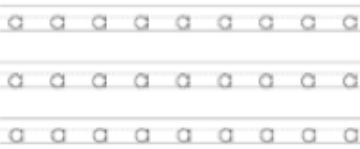




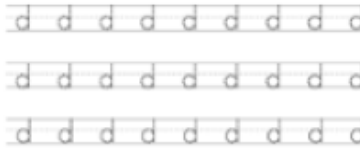


o, c, o, c, c, o...	<p>Dictate the new letter sounds</p> <p>Monitor while students write the letter that represents that sound.</p>	<p>Write & Say Sound</p> <p><i>Listen carefully and Write each of the letters, while Saying the Sounds on the lines below; be sure to use proper strokes.</i></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
Letter-Sound Transfer		
lot, cot, tot	<p>Dictate each word & Monitor</p>	<p>Say, Unblend, & Write</p> <p><i>Letter-Sound Transfer:</i> <i>Listen carefully to the words, then Unblend and spell each one on the lines below; be sure to use proper strokes.</i></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>




Lesson 4

Letter Stroke Review & Practice		
Stimulus	Teacher	Student
 <p>*start just below the mid-point, curve left, close*</p>	<p>Review letter formation & sound Observe & Guide in writing</p>	<p>Letter Stroke Review: Review the strokes of the letters below:</p> <div style="border: 1px solid black; display: inline-block; padding: 2px;">   </div> <p>Write each of the letters across one line, while saying the sound of the letter. Be sure to self-monitor for proper stroke.</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
 <p>*start just below the mid-point; curve left, stop short*</p>	<p>Review letter formation & sound Observe & Guide in writing</p>	
<p>l, o, l, c, t, o, t, c, l, l, l, c, t...</p>	<p>Dictate the letter sounds learned so far.</p> <p>Monitor while students write the letter that represents that sound.</p>	<p>Write, Say Sound, Self-Assess & Color chart</p> <p>Letter-Sound Practice: Listen carefully and write each of the letters, while saying the sound of the letter. Be sure to self-monitor for proper stroke. Put a star by your best letters!</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>




Letter-Sound Transfer		
clot, lilt, lotic	<p>Dictate each word & Monitor</p> <p>Point out two syllable word</p>	<p>Say word, Unblend, Write, Self-Assess & Color chart</p> <p><i>Letter-Sound Transfer:</i> <i>Listen carefully to the words; then unblend and spell each one on the lines below; be sure to use proper strokes. Put a star by your best words!</i></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
It did clot	<p>Dictate phrase & Monitor student writing</p>	<p>Say phrase & Write</p> <p><i>Listen carefully to the sentence; then unblend and spell the sentence on the lines below; be sure to use proper strokes.</i></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
Fluency Training		
It did clot	<p>Write phrase at the top of each writing journal. Time for 2 minutes</p>	<p>Copy phrase for two minutes; count and graph letters per minute</p>

Lesson 5





Letter Stroke Introduction & Practice		
Stimulus	Teacher	Student
	Model letter (vowel) formation & sound *start just below the mid-point, curve left, close, push up to midpoint & pull straight down*	<p>Letter Stroke Instruction: <i>Look at the new letter; let's practice the stroke.</i></p> <div style="border: 1px solid black; padding: 5px; display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>start just below the mid-point, curve left, close, push up to midpoint & pull straight down</p> </div> </div> <p>Letter-Sound Practice: <i>Trace each letter; while saying the sound of the letter.</i></p> <p>  </p> <p><i>Write the letter across each line, while saying the sound; be sure to use the proper letter formation</i></p> <p>  </p>
	Teach letter formation	
	Observe & Guide in tracing	
	Observe & Guide in writing	
	Model letter formation & sound *start just below the mid-point, curve left, close, push up to top & pull straight down*	<p>Letter Stroke Instruction: <i>Look at the new letter; let's practice the stroke.</i></p> <div style="border: 1px solid black; padding: 5px; display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>start just below the mid-point, curve left, close, push up to top & pull straight down</p> </div> </div> <p>Letter-Sound Practice: <i>Trace each letter; while saying the sound of the letter.</i></p> <p>  </p> <p><i>Write the letter across each line, while saying the sound; be sure to use the proper letter formation</i></p> <p>  </p>
	Teach letter formation	
	Observe & Guide in tracing	
	Observe & Guide in writing	

	<p>Model letter formation & sound</p> <p>*start just below the mid-point, curve left, close, push up to midpoint & pull straight down, curve*</p>	<p>Letter Stroke Instruction: Look at the new letter; let's practice the stroke.</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;">  <p>start just below the mid-point, curve left, close, push up to midpoint & pull straight down, curve</p> </div> <p>Letter-Sound Practice: Trace each letter; while saying the sound of the letter.</p> <p>g g g g g g g g g</p> <p>g g g g g g g g g</p> <p>g g g g g g g g g</p> <p>Write the letter across each line, while saying the sound; be sure to use the proper letter formation</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
	<p>Teach letter formation</p>	
	<p>Observe & Guide in tracing</p>	
	<p>Observe & Guide in writing</p>	
<p>d, g, a, g, a, d, g...</p>	<p>Dictate the new letter sounds</p> <p>Monitor while students write the letter that represents that sound.</p>	<p>Write & Say Sound</p> <p>Listen carefully and Write each of the letters, while saying the sounds on the lines below; be sure to use proper strokes.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p>Letter-Sound Transfer</p>		
<p>at, get, dog</p>	<p>Dictate each word & Monitor</p>	<p>Say, Unblend, & Write</p> <p>Letter-Sound Transfer: Listen carefully to the words, then Unblend and spell each one on the lines below; be sure to use proper strokes.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>




Lesson 6

Letter Stroke Review & Practice		
Stimulus	Teacher	Student
 <p>"start just below the mid-point, curve left, close, push up to midpoint & pull straight down"</p>	Review letter formation & sound Observe & Guide in writing	Write, Say Sound, & Assess
 <p>"start just below the mid-point, curve left, close, push up to top & pull straight down"</p>	Review letter formation & sound Observe & Guide in writing	Write, Say Sound, & Assess
 <p>"start just below the mid-point, curve left, close, push up to midpoint & pull straight down, curve"</p>	Review letter formation & sound Observe & Guide in writing	Write, Say, & Assess
a, l, i, o, c, t, d, g...	Dictate the letter sounds learned so far. Monitor while students write the letter that represents that sound.	Write, Say Sound, Self-Assess & Color chart
Letter-Sound Transfer		
got, cat, tag	Dictate each word & Monitor	Say word, Unblend, Write, Self-Assess & Color chart
got a dog	Dictate phrase & Monitor student writing	Say phrase & Write
Fluency Training		
got a dog	Write phrase at the top of each writing journal. Time for 2 minutes	Copy Phrase for two minutes; count and graph letters per minute

Lesson 7

Letter Stroke Introduction & Practice		
Stimulus	Teacher	Student
	Model letter formation & sound "start at the top, pull straight down, push up and curve right & close"	
	Teach letter formation	
	Observe & Guide in tracing	Trace & Say Sound
	Observe & Guide in writing	Write & Say Sound
	Model letter formation & sound "start at the mid-point, pull straight down, push up and curve right & close"	
	Teach letter formation	
	Observe & Guide in tracing	Trace & Say Sound
	Observe & Guide in writing	Write & Say Sound
p, b, p, p, b, b, p, b...	Dictate the new letter sounds Monitor while students write the letter that represents that sound.	Write & Say Sound
Letter-Sound Transfer		
big, bat, plot	Dictate each word & Monitor	Say, Unblend, & Write

Lesson 8





Letter Stroke Review & Practice		
Stimulus	Teacher	Student
 "start at the top, pull straight down, push up and curve right & close"	Review letter formation & sound Observe & Guide in writing	Write, Say Sound, & Assess
 "start at the mid-point, pull straight down, push up and curve right & close"	Review letter formation & sound Observe & Guide in writing	Write, Say Sound, & Assess
a, l, o, i, c, p, t, g, b, d...	Dictate the letter sounds learned so far. Monitor while students write the letter that represents that sound.	Write, Say Sound, Self-Assess & Color chart.
Letter-Sound Transfer		
dip, clap, blot	Dictate each word & Monitor	Say word, Unblend, Write, Self-Assess & Color chart.
 A big dog got it.	Teach sentence definition . Show sentence frame . Dictate sentence & Monitor student writing	Say sentence & Write
Fluency Training		
A big dog got it.	Write sentence at the top of each writing journal. Time for 2 minutes	Copy sentence for two minutes; count and graph letters per minute

Mastery Check #1




Mastery Check #1		
Stimulus	Teacher	Student
l, i, o, a, d, b, g, c, t, p	Dictate letters & Record on monitoring sheet	Write & Say Sound
A big cat got it to blot a dot.	Dictate sentence & Record on monitoring sheet	Write & Say Sentence

*Use Mastery Check form to record student responses







Lesson 9

Letter Stroke Introduction & Practice		
Stimulus	Teacher	Student
	<p>Model letter formation & sound</p> <p>"start at the midpoint, pull straight down, push up to the midpoint and curve over; pull straight down, push up and curve over, pull straight down"</p>	
	Teach letter formation	
	Observe & Guide in tracing	Trace & Say Sound
	Observe & Guide in writing	Write & Say Sound
	<p>Model letter (vowel) formation & sound</p> <p>"start at the mid-point; pull straight down, curve over, push up to midpoint and pull straight down."</p>	
	Teach letter formation	
	Observe & Guide in tracing	Trace & Say Sound
	Observe & Guide in writing	Write & Say Sound
m, u, m, u, u, m, u...	<p>Dictate the new letter sounds</p> <p>Monitor while students write the letter that represents that sound.</p>	Write & Say Sound
Letter-Sound Transfer		
mat, lamp, but	Dictate each word & Monitor	Say, Unblend, & Write





Lesson 10

Letter Stroke Review & Practice		
Stimulus	Teacher	Student
 <p>'start at the midpoint, pull straight down, push back up to the midpoint and curve right; pull straight down, push up and curve right, pull straight down.'</p>	Review letter formation & sound Observe & Guide in writing	Write, Say Sound, & Assess
 <p>"start at the mid-point; pull straight down, curve right, push up to midpoint and pull straight down."</p>	Review letter formation & sound Observe & Guide in writing	Write, Say Sound, & Assess
a, l, o, i, c, p, t, p, b, m, u, g...	Dictate only letter sounds learned so far that students need extra practice. Monitor while students write the letter that represents that sound.	Write, Say Sound, Self-Assess & Color chart
Letter-Sound Transfer		
mill, camp, dump	Teach FLOSS rule. When a one syllable base word has a short vowel and ends with f, l, s ; you double the final f, l, or s. Dictate each word & Monitor	Say word, Unblend, Write, Self-Assess & Color chart
 <p>The dog can't tug it.</p>	Review sentence. Teach contractions ; apostrophe holds the place of a missing letter. Dictate sentence & Monitor student writing	Say sentence & Write
Fluency Training		
A dog can't tug it.	Write sentence at the top of each writing journal. Time for 2 minutes	Copy sentence for two minutes; count and graph letters per minute





Lesson 11

Letter Stroke Introduction & Practice		
Stimulus	Teacher	Student
	Model letter formation & sound 'start at the midpoint, pull straight down, push back up to the midpoint and curve right, pull straight down'	
	Teach letter formation	
	Observe & Guide in tracing	Trace & Say Sound
	Observe & Guide in writing	Write & Say Sound
	Model letter formation & sound 'start at the top, pull straight down, push back up to the mid-point, curve right, pull straight down'	
	Teach letter formation	
	Observe & Guide in tracing	Trace & Say Sound
	Observe & Guide in writing	Write & Say Sound
	Model letter formation & sound 'start at the mid-point, pull straight down; push back up to the mid-point, curve right, stop'	
	Teach letter formation	
	Observe & Guide in tracing	Trace & Say Sound
	Observe & Guide in writing	Write & Say Sound
r, n, h, n, r, h, h, r...	Dictate the new letter sounds Monitor while students write the letter that represents that sound.	Write & Say Sound
Letter-Sound Transfer		
run, hand, punt	Dictate each word & Monitor	Say, Unblend, & Write




Lesson 12

Letter Stroke Review & Practice		
Stimulus	Teacher	Student
 "start at the top, pull straight down, push back up to the mid-point, curve right, pull straight down"	Review letter formation & sound Observe & Guide in writing	Write, Say Sound, & Assess
 "start at the mid-point, pull straight down; push back up to the mid-point, curve right, stop"	Review letter formation & sound Observe & Guide in writing	Write, Say Sound, & Assess
 "start at the mid-point, pull straight down, push back up to the mid-point, curve right, pull straight down"	Review letter formation & sound Observe & Guide in writing	Write, Say Sound, & Assess
h, o, a, b, d, c, g, u, m, n, t, i, l, r, p...	Dictate only letter sounds learned so far that students need extra practice. Monitor while students write the letter that represents that sound.	Write, Say Sound, Self-Assess & Color chart
Letter-Sound Transfer		
mint, run, hunt	Dictate each word & Monitor	Say word, Unblend, Write, Self-Assess & Color chart
 Did the rabbit dig up the plant?	Review sentence. Teach Rabbit Rule . Dictate sentence & Monitor student writing	Say sentence & Write
Fluency Training		
Did the rabbit dig up the plant?	Write sentence at the top of each writing journal. Time for 2 minutes	Copy sentence for two minutes; count and graph letters per minute





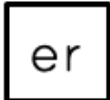

Lesson 13

Letter Stroke Introduction & Practice		
Stimulus	Teacher	Student
	Model letter formation & sound "start at the midpoint; pull straight down and curve left; dot"	
	Teach letter formation	
	Observe & Guide in tracing	Trace & Say Sound
	Observe & Guide in writing	Write & Say Sound
	Model letter formation & sound "start just below the top; curve left, pull straight down, and cross above midpoint"	
	Teach letter formation	
	Observe & Guide in tracing	Trace & Say Sound
	Observe & Guide in writing	Write & Say Sound
f, j, j, f, j, f, j...	Teach that now you have 4 graphemes that can represent the (j) sound. In the initial position: g & j and in the final position: ge & dge. Dictate the new letter sounds Monitor while students write the letter that represents that sound.	Write & Say Sound
Letter-Sound Transfer		
frog, flag, job	Dictate each word & Monitor	Say, Unblend, & Write





Lesson 14

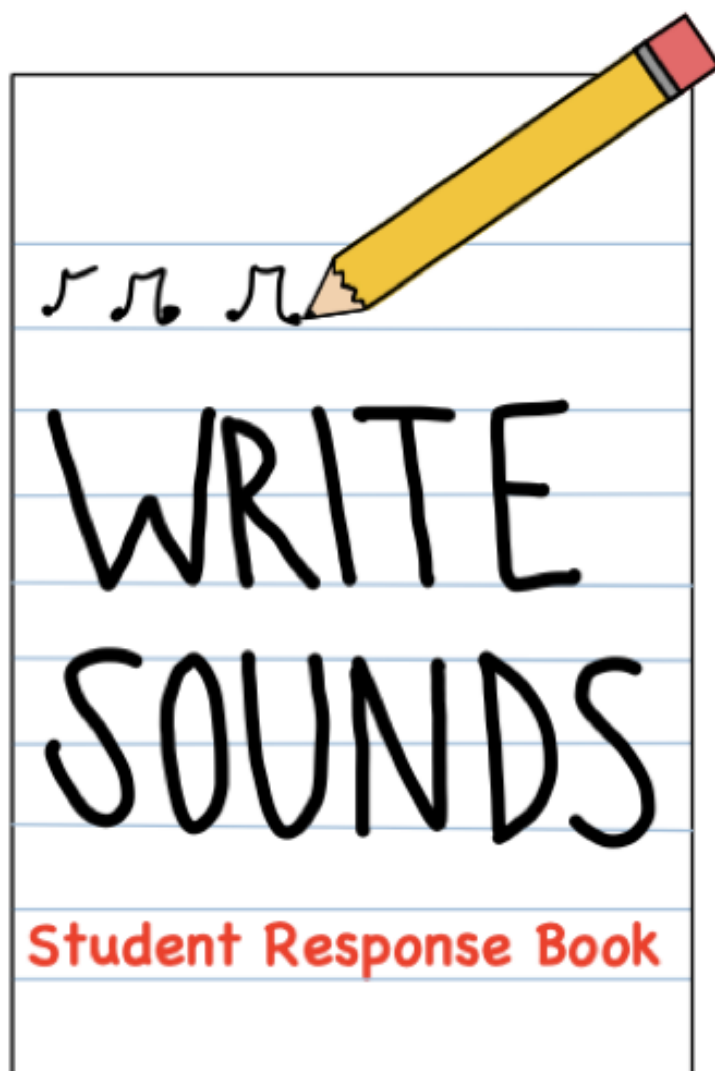
Letter Stroke Review & Practice		
Stimulus	Teacher	Student
 <p>"start at the midpoint; pull straight down and curve left; dot"</p>	<p>Review letter formation & sound Observe & Guide in writing</p>	<p>Write, Say Sound, & Assess</p>
 <p>"start just below the top; curve left, pull straight down, and cross above midpoint"</p>	<p>Review letter formation & sound Observe & Guide in writing</p>	<p>Write, Say Sound, & Assess</p>
<p>h, o, a, j, b, d, c, g, u, m, n, t, i, l, p, d, f...</p>	<p>Dictate only letter sounds learned so far that students need extra practice. Monitor while students write the letter that represents that sound.</p>	<p>Write, Say Sound, Self-Assess & Color chart</p>
Letter-Sound Transfer		
<p>flip, flat, jump</p>	<p>Dictate each word & Monitor</p>	<p>Say word, Unblend, Write, Self-Assess & Color chart</p>
 <p>The rabbit can jump and run.</p>	<p>Review sentence definition. Dictate sentence & Monitor student writing</p>	<p>Say sentence & Write</p>
Fluency Training		
<p>The rabbit can jump and run.</p>	<p>Write sentence at the top of each writing journal. Time for 2 minutes</p>	<p>Copy sentence for two minutes; count and graph letters per minute</p>

Lesson 15

Letter Stroke Introduction & Practice		
Stimulus	Teacher	Student
	Model letter formation & sound *start just below the mid-point, curve left across, the curve right swing up*	
	Teach letter formation	
	Observe & Guide in tracing	Trace & Say Sound
	Observe & Guide in writing	Write & Say Sound
	Model letter formation & sound *start at the half-mid-point; move straight across, right, curve up, around left, stop short*	
	Teach letter formation	
	Observe & Guide in tracing	Trace & Say Sound
	Observe & Guide in writing	Write & Say Sound
	Review: letters e & r *start at the half-mid-point; move straight across, right, curve up, around left, stop short; start at the mid-point, pull straight down; push back up to the mid-point, curve right, stop*	
	Teach grapheme formation	
	Observe & Guide in tracing	Trace & Say Sound
	Observe & Guide in writing	Write & Say Sound
s, e, er, e, s, er...	Dictate the new letter sounds Monitor while students write the letter that represents that sound.	Write & Say Sound
Letter-Sound Transfer		
spent, stump, enter	Dictate each word & Monitor	Say, Unblend, & Write

Lesson 16

Letter Stroke Review & Practice		
Stimulus	Teacher	Student
 *start just below the mid-point, curve left across, the curve right swing up*	Review letter formation & sound Observe & Guide in writing	Write, Say Sound, & Assess
 *start at the half-mid-point; move straight across, right, curve up, around left, stop short*	Review letter formation & sound Observe & Guide in writing	Write, Say Sound, & Assess
 *start at the half-mid-point; move straight across, right, curve up, around left, stop short/start at the mid-point, pull straight down; push back up to the mid-point, curve right, stop*	Review letter formation & sound Observe & Guide in writing	Write, Say, & Assess
h, o, a, e, j, b, s, d, c, g, u, m, n, t, i, l, r, p, er, d, f...	Dictate only letter sounds learned so far that students need extra practice. Monitor while students write the letter that represents that sound.	Write, Say Sound, Self-Assess & Color chart
Letter-Sound Transfer		
sudden, often, number	Dictate each word & Monitor	Say word, Unblend, Write, Self-Assess & Color chart
 A sudden frost got the frog jumping!	Review sentence definition. Dictate sentence & Monitor student writing	Say sentence & Write
Fluency Training		
A sudden frost got the frog jumping!	Write sentence at the top of each writing journal. Time for 2 minutes	Copy sentence for two minutes; count and graph letters per minute



Pre-Lesson

Write Sounds Letter Types

Tall: b, d, f, h, k, l, t

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Small: a, c, e, i, m, n, o, r,
s, u, v, w, x, z

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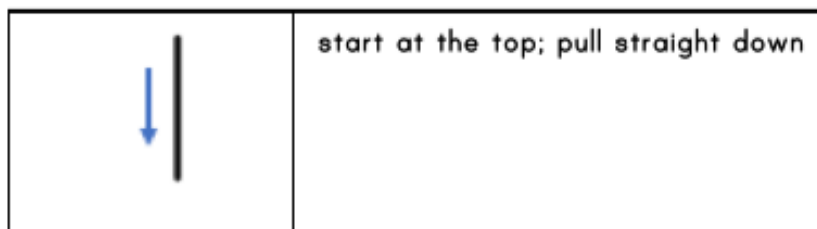
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Falling: g, j, p, q, y

Handwriting practice lines consisting of four sets of three horizontal lines (top solid, middle dashed, bottom solid).

Lesson 1**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

*Trace each letter; while **Saying the Sound** of the letter.*

*Write the letter across each line, while **Saying the Sound**; be sure to use the proper letter formation*

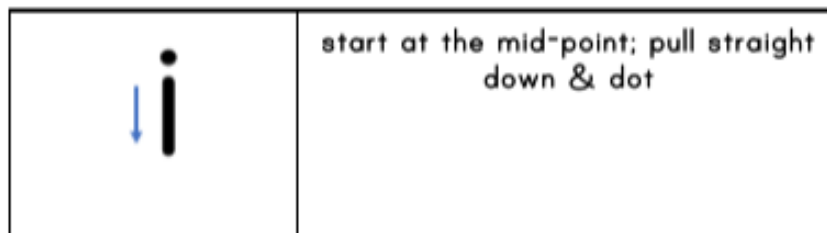


*Write the letter across each line, while **Saying the Sound**; be sure to use the proper letter formation.*



Lesson 1**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

*Trace each letter; while **Saying the Sound** of the letter.*



Write the letter across each line, while **Saying the Sound**; be sure to use the proper letter formation



Lesson 1**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

Trace each letter; while Saying the Sound of the letter.



Write the letter across each line, while Saying the Sound; be sure to use the proper letter formation

Blank handwriting lines for independent practice, consisting of three rows of solid top and bottom lines with a dashed middle line.

Lesson 1

Listen carefully and Write each of the letters, while Saying the Sounds on the lines below; be sure to use proper strokes.

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Letter-Sound Transfer:

Listen carefully to the words, then Unblend and spell each one on the lines below; be sure to use proper strokes.

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Lesson 2**Letter Stroke Review:**

Review the strokes of the letters below.



Write each of the letters across one line, while saying the sound of the letter. Be sure to self-monitor for proper stroke.

Handwriting practice lines for the letter stroke review. Each set consists of a solid top line, a dashed middle line, and a solid bottom line.

Line 1: _____

Line 2: _____

Line 3: _____

Line 4: _____

Line 5: _____

Line 6: _____

Letter-Sound Practice:

Listen carefully and write each of the letters, while saying the sound of the letter. Be sure to self-monitor for proper stroke. Put a star by your best letters!

Handwriting practice lines for letter-sound practice. Each set consists of a solid top line, a dashed middle line, and a solid bottom line.

Line 1: _____

Line 2: _____

Line 3: _____

Line 4: _____

Line 5: _____

Line 6: _____

Lesson 2

Letter-Sound Transfer:

Listen carefully to the words, then unblend and spell each one on the lines below; be sure to use proper strokes. Put a star by your best words!

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Listen carefully to the sentence, then unblend and spell the sentence on the lines below; be sure to use proper strokes.

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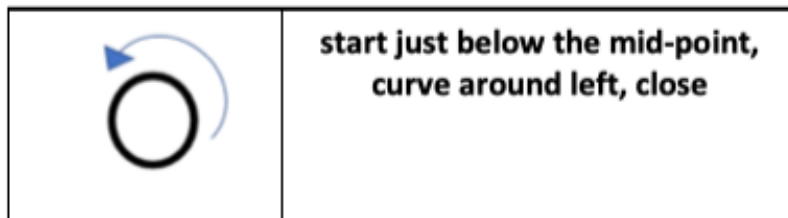
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Fluency Training:

Grab your Handwriting Journal! Get ready to write!

Lesson 3**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

*Trace each letter; while **Saying the Sound** of the letter.*

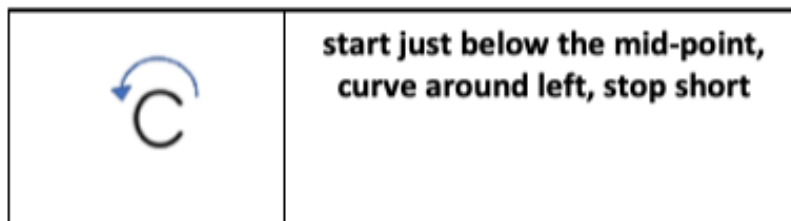


Write the letter across each line, while **Saying the Sound**; be sure to use the proper letter formation

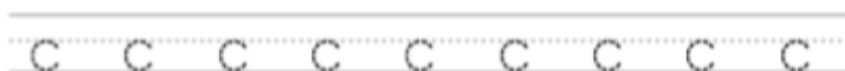


Lesson 3**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

*Trace each letter; while **Saying the Sound** of the letter.*



Write the letter across each line, while **Saying the Sound**; be sure to use the proper letter formation



Lesson 3

Listen carefully and Write each of the letters, while Saying the Sounds on the lines below; be sure to use proper strokes.

Handwriting practice lines consisting of three sets of three horizontal lines (top solid, middle dashed, bottom solid).

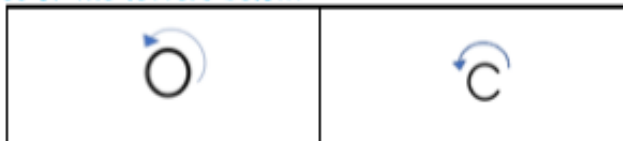
Letter-Sound Transfer:

Listen carefully to the words, then Unblend and spell each one on the lines below; be sure to use proper strokes.

Handwriting practice lines consisting of three sets of three horizontal lines (top solid, middle dashed, bottom solid).

Lesson 4**Letter Stroke Review:**

Review the strokes of the letters below.



Write each of the letters across one line, while saying the sound of the letter. Be sure to self-monitor for proper stroke.

Four sets of handwriting lines for practice. Each set consists of a solid top line, a dashed middle line, and a solid bottom line.

Letter-Sound Practice:

Listen carefully and write each of the letters, while saying the sound of the letter. Be sure to self-monitor for proper stroke. Put a star by your best letters!

Four sets of handwriting lines for practice. Each set consists of a solid top line, a dashed middle line, and a solid bottom line.

Lesson 4

Letter-Sound Transfer:

Listen carefully to the words, then unblend and spell each one on the lines below; be sure to use proper strokes. Put a star by your best words!

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Listen carefully to the sentence, then unblend and spell the sentence on the lines below; be sure to use proper strokes.

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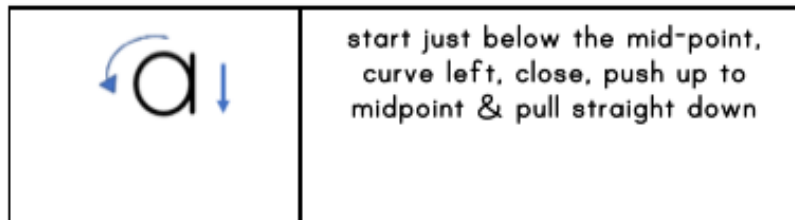
Fluency Training:

Grab your Handwriting Journal! Get ready to write!

Lesson 5

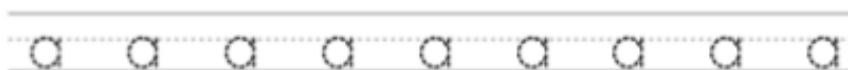
Letter Stroke Instruction:

Look at the new letter; let's practice the stroke.



Letter-Sound Practice:

*Trace each letter; while **Saying the Sound** of the letter.*



Write the letter across each line, while **Saying the Sound**; be sure to use the proper letter formation

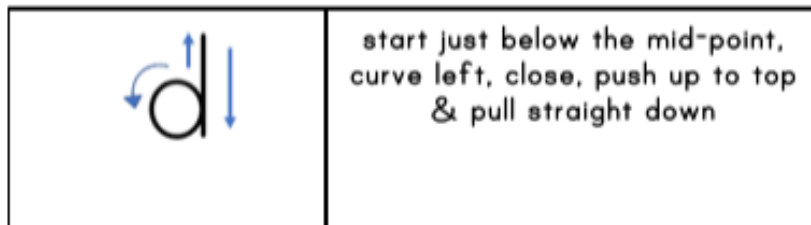
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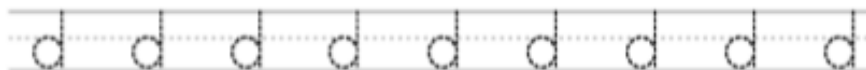
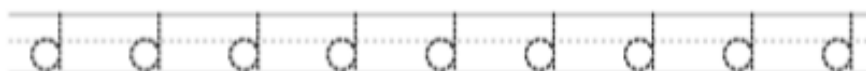
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Lesson 5**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

Trace each letter; while Saying the Sound of the letter.

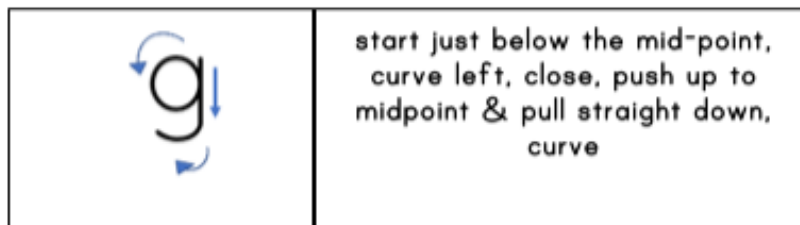


Write the letter across each line, while Saying the Sound; be sure to use the proper letter formation

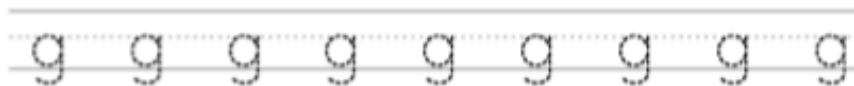
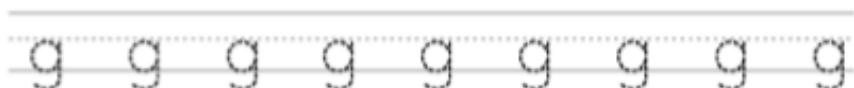
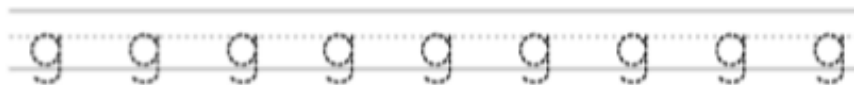
Four sets of handwriting lines (top solid, middle dashed, bottom solid) for independent writing practice of the letter 'd'.

Lesson 5**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

*Trace each letter; while **Saying the Sound** of the letter.*



Write the letter across each line, while **Saying the Sound**; be sure to use the proper letter formation

Blank writing lines for independent practice. Each line consists of a solid top line, a dashed middle line, and a solid bottom line.

Lesson 5

Listen carefully and Write each of the letters, while Saying the Sounds on the lines below; be sure to use proper strokes.

Handwriting practice lines consisting of three sets of horizontal lines. Each set includes a solid top line, a dashed middle line, and a solid bottom line.

Letter-Sound Transfer:

Listen carefully to the words, then Unblend and spell each one on the lines below; be sure to use proper strokes.

Handwriting practice lines consisting of three sets of horizontal lines. Each set includes a solid top line, a dashed middle line, and a solid bottom line.

Lesson 6**Letter Stroke Review:**

Review the strokes of the letters below.



Write each of the letters across one line, while saying the sound of the letter. Be sure to self-monitor for proper stroke.

Four sets of handwriting lines for practice. Each set consists of a solid top line, a dashed middle line, and a solid bottom line.

Letter-Sound Practice:

Listen carefully and write each of the letters, while saying the sound of the letter. Be sure to self-monitor for proper stroke. Put a star by your best letters!

Four sets of handwriting lines for practice. Each set consists of a solid top line, a dashed middle line, and a solid bottom line.

Lesson 6

Letter-Sound Transfer:

Listen carefully to the words, then unblend and spell each one on the lines below; be sure to use proper strokes. Put a star by your best words!

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Listen carefully to the sentence, then unblend and spell the sentence on the lines below; be sure to use proper strokes.

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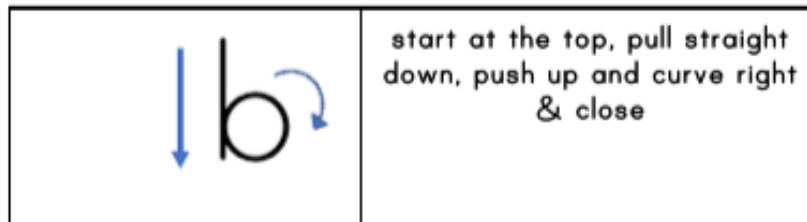
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Fluency Training:

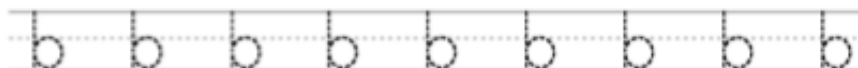
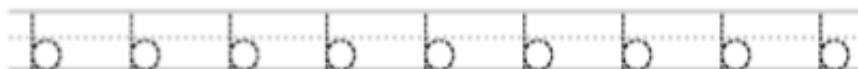
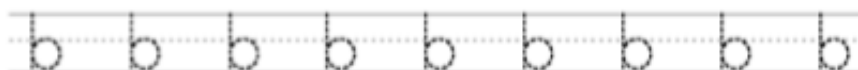
Grab your Handwriting Journal! Get ready to write!

Lesson 7**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

*Trace each letter; while **Saying the Sound** of the letter.*



*Write the letter across each line, while **Saying the Sound**; be sure to use the proper letter formation*

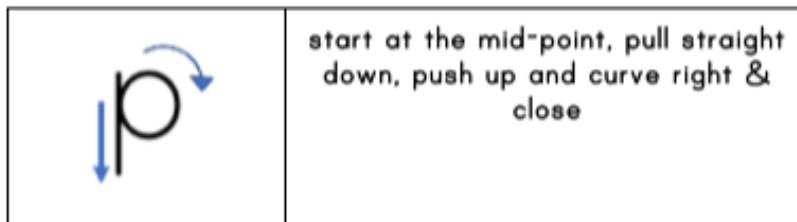
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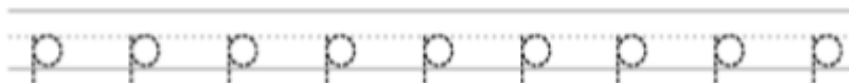
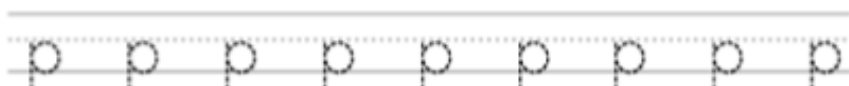
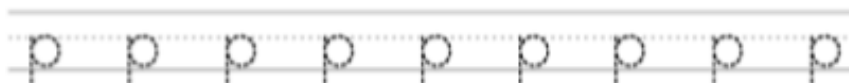
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Lesson 7**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

*Trace each letter; while **Saying the Sound** of the letter.*



Write the letter across each line, while **Saying the Sound**; be sure to use the proper letter formation

Blank handwriting lines for independent practice, consisting of four sets of three lines (top, middle, bottom) each.

Lesson 7

Listen carefully and Write each of the letters, while Saying the Sounds on the lines below; be sure to use proper strokes.

Handwriting practice lines consisting of three sets of horizontal lines. Each set includes a solid top line, a dashed middle line, and a solid bottom line.

Letter-Sound Transfer:

Listen carefully to the words, then Unblend and spell each one on the lines below; be sure to use proper strokes.

Handwriting practice lines consisting of three sets of horizontal lines. Each set includes a solid top line, a dashed middle line, and a solid bottom line.

Lesson 8**Letter Stroke Review:**

Review the strokes of the letters below.



Write each of the letters across one line, while saying the sound of the letter. Be sure to self-monitor for proper stroke.

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Letter-Sound Practice:

Listen carefully and write each of the letters, while saying the sound of the letter. Be sure to self-monitor for proper stroke. Put a star by your best letters!

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Lesson 8**Letter-Sound Transfer:**

Listen carefully to the words, then unblend and spell each one on the lines below; be sure to use proper strokes. Put a star by your best words!

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Listen carefully to the sentence, then unblend and spell the sentence on the lines below; be sure to use proper strokes.

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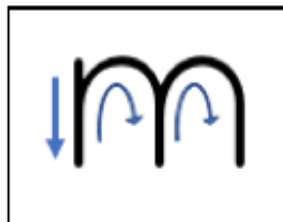
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Fluency Training:

Grab your Handwriting Journal! Get ready to write!

Lesson 9**Letter Stroke Instruction:**

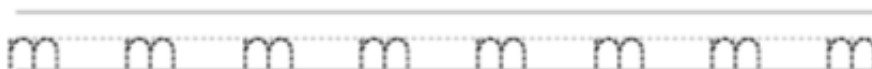
Look at the new letter; let's practice the stroke.



start at the midpoint, pull straight down, push up to the midpoint and curve over; pull straight down, push up and curve over, pull straight down

Letter-Sound Practice:

*Trace each letter; while **Saying the Sound** of the letter.*

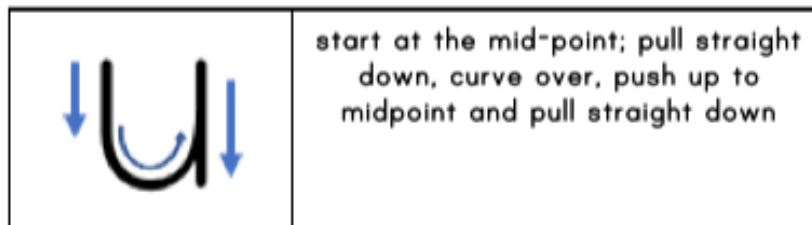


Write the letter across each line, while **Saying the Sound**; be sure to use the proper letter formation

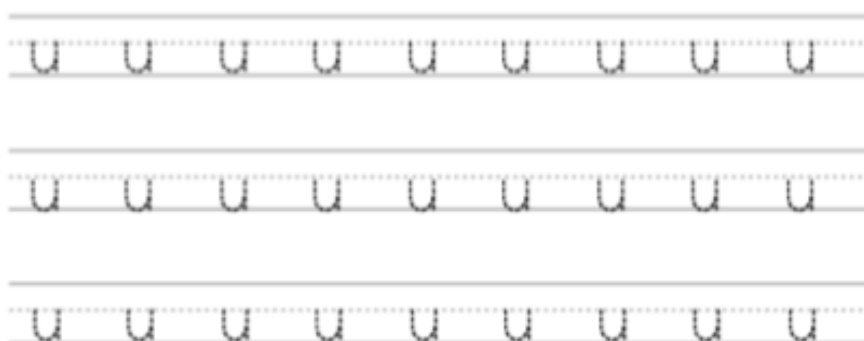
Four sets of handwriting lines (top solid, middle dashed, bottom solid) for independent practice of writing the letter 'm'.

Lesson 9**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

Trace each letter; while Saying the Sound of the letter.



Write the letter across each line, while Saying the Sound; be sure to use the proper letter formation



Lesson 9

Listen carefully and Write each of the letters, while Saying the Sounds on the lines below; be sure to use proper strokes.

Handwriting practice lines consisting of three sets of horizontal lines. Each set includes a solid top line, a dashed middle line, and a solid bottom line.

Letter-Sound Transfer:

Listen carefully to the words, then Unblend and spell each one on the lines below; be sure to use proper strokes.

Handwriting practice lines consisting of three sets of horizontal lines. Each set includes a solid top line, a dashed middle line, and a solid bottom line.

Lesson 10**Letter Stroke Review:**

Review the strokes of the letters below.



Write each of the letters across one line, while saying the sound of the letter. Be sure to self-monitor for proper stroke.

Four sets of handwriting lines for practicing the letters 'm' and 'u'. Each set consists of a solid top line, a dashed middle line, and a solid bottom line.

Letter-Sound Practice:

Listen carefully and write each of the letters, while saying the sound of the letter. Be sure to self-monitor for proper stroke. Put a star by your best letters!

Four sets of handwriting lines for practicing the letters 'm' and 'u'. Each set consists of a solid top line, a dashed middle line, and a solid bottom line.

Lesson 10

Letter-Sound Transfer:

Listen carefully to the words, then unblend and spell each one on the lines below; be sure to use proper strokes. Put a star by your best words!

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Listen carefully to the sentence, then unblend and spell the sentence on the lines below; be sure to use proper strokes.

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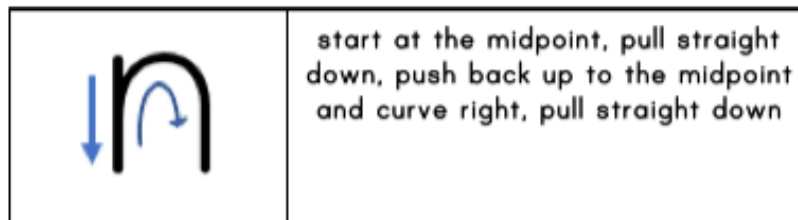
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Fluency Training:

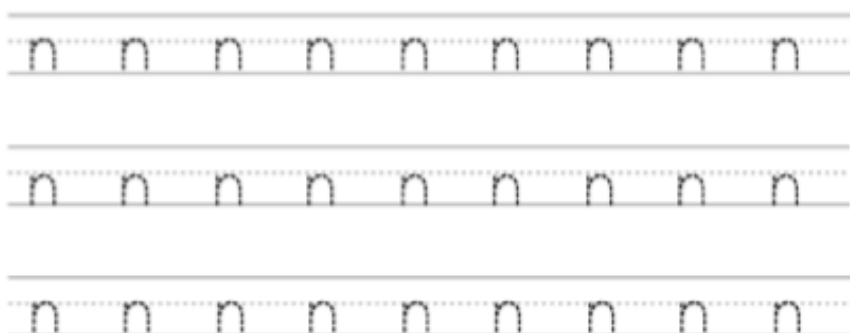
Grab your Handwriting Journal! Get ready to write!

Lesson 11**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

Trace each letter; while Saying the Sound of the letter.

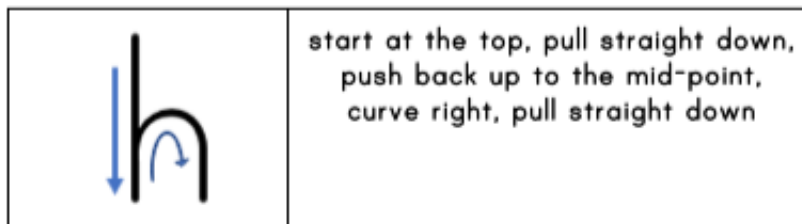


Write the letter across each line, while Saying the Sound; be sure to use the proper letter formation

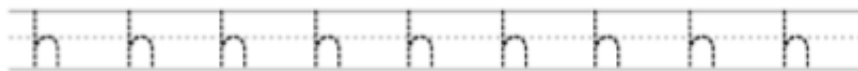
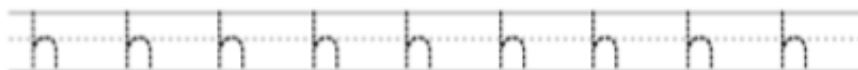


Lesson 11**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

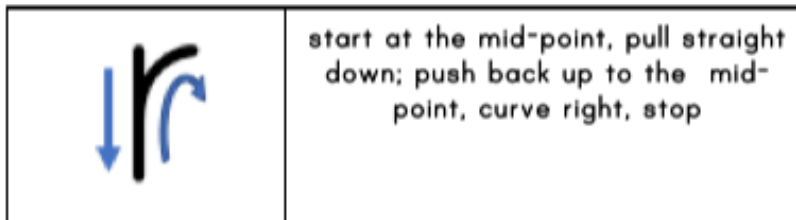
*Trace each letter; while **Saying the Sound** of the letter.*



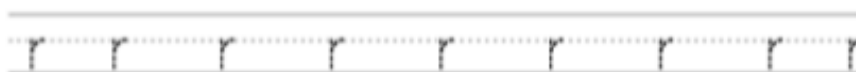
Write the letter across each line, while **Saying the Sound**; be sure to use the proper letter formation

Lesson 11**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

Trace each letter; while Saying the Sound of the letter.



Write the letter across each line, while Saying the Sound; be sure to use the proper letter formation

Blank handwriting lines for independent practice of the letter 'r'.

Lesson 11

Listen carefully and Write each of the letters, while Saying the Sounds on the lines below; be sure to use proper strokes.

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Letter-Sound Transfer:

Listen carefully to the words, then Unblend and spell each one on the lines below; be sure to use proper strokes.

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Lesson 12**Letter Stroke Review:**

Review the strokes of the letters below.



Write each of the letters across one line, while saying the sound of the letter. Be sure to self-monitor for proper stroke.

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Letter-Sound Practice:

Listen carefully and write each of the letters, while saying the sound of the letter. Be sure to self-monitor for proper stroke. Put a star by your best letters!

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Lesson 12

Letter-Sound Transfer:

Listen carefully to the words, then unblend and spell each one on the lines below; be sure to use proper strokes. Put a star by your best words!

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Listen carefully to the sentence, then unblend and spell the sentence on the lines below; be sure to use proper strokes.

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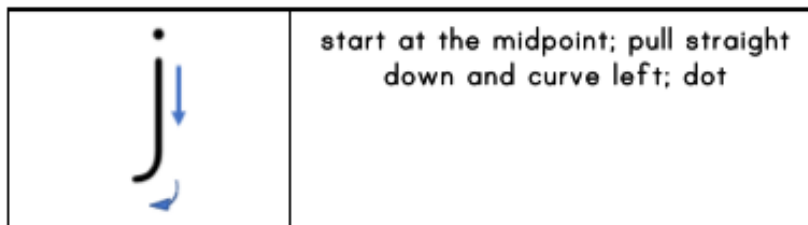
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Fluency Training:

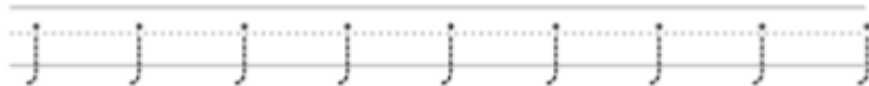
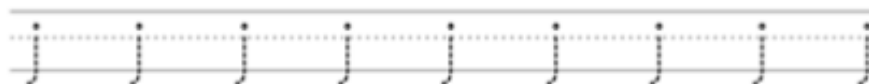
Grab your Handwriting Journal! Get ready to write!

Lesson 13**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

Trace each letter; while Saying the Sound of the letter.

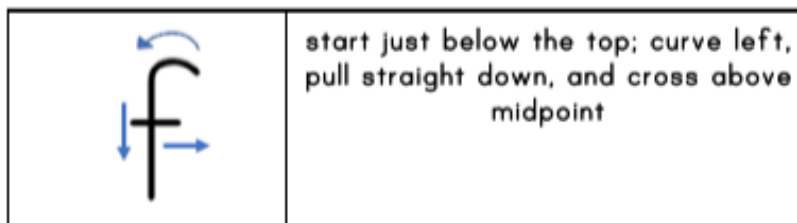


Write the letter across each line, while Saying the Sound; be sure to use the proper letter formation

Four sets of handwriting lines (top solid, middle dotted, bottom solid) for independent practice of writing the letter 'j'.

Lesson 13**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

Trace each letter; while Saying the Sound of the letter.



Write the letter across each line, while Saying the Sound; be sure to use the proper letter formation

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Lesson 13

Listen carefully and Write each of the letters, while Saying the Sounds on the lines below; be sure to use proper strokes.

Handwriting practice lines consisting of three sets of horizontal lines. Each set includes a solid top line, a dashed middle line, and a solid bottom line.

Letter-Sound Transfer:

Listen carefully to the words, then Unblend and spell each one on the lines below; be sure to use proper strokes.

Handwriting practice lines consisting of three sets of horizontal lines. Each set includes a solid top line, a dashed middle line, and a solid bottom line.

Lesson 14**Letter Stroke Review:**

Review the strokes of the letters below.



Write each of the letters across one line, while saying the sound of the letter. Be sure to self-monitor for proper stroke.

Handwriting practice lines for the letter stroke review. Each set consists of a solid top line, a dashed middle line, and a solid bottom line. There are three such sets of lines provided for practice.

Letter-Sound Practice:

Listen carefully and write each of the letters, while saying the sound of the letter. Be sure to self-monitor for proper stroke. Put a star by your best letters!

Handwriting practice lines for letter-sound practice. Each set consists of a solid top line, a dashed middle line, and a solid bottom line. There are three such sets of lines provided for practice.

Lesson 14

Letter-Sound Transfer:

Listen carefully to the words, then unblend and spell each one on the lines below; be sure to use proper strokes. Put a star by your best words!

Four sets of handwriting lines for letter-sound transfer practice. Each set consists of a solid top line, a dashed middle line, and a solid bottom line.

Listen carefully to the sentence, then unblend and spell the sentence on the lines below; be sure to use proper strokes.

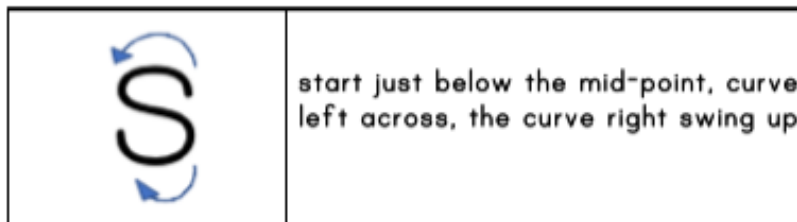
Four sets of handwriting lines for sentence unblending and spelling practice. Each set consists of a solid top line, a dashed middle line, and a solid bottom line.

Fluency Training:

Grab your Handwriting Journal! Get ready to write!

Lesson 15**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

*Trace each letter; while **Saying the Sound** of the letter.*

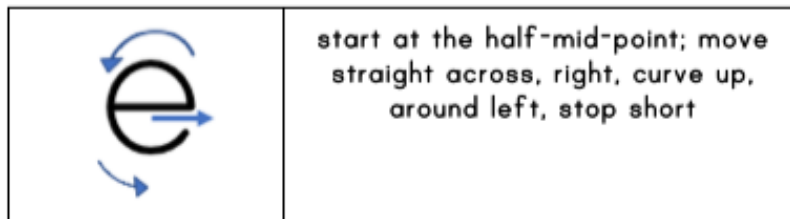


Write the letter across each line, while **Saying the Sound**; be sure to use the proper letter formation

Four sets of blank handwriting lines, each consisting of a solid top line, a dashed middle line, and a solid bottom line, for independent letter writing practice.

Lesson 15**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.

**Letter-Sound Practice:**

Trace each letter; while Saying the Sound of the letter.

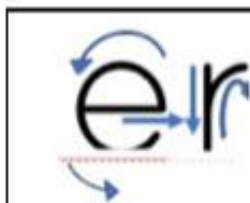


Write the letter across each line, while Saying the Sound; be sure to use the proper letter formation

Blank handwriting lines for independent practice, consisting of three sets of solid top and bottom lines with a dashed middle line.

Lesson 15**Letter Stroke Instruction:**

Look at the new letter; let's practice the stroke.



start at the half-mid-point; move straight across, right, curve up, around left, stop short; start at the mid-point, pull straight down; push back up to the mid-point, curve right, stop

Letter-Sound Practice:

Trace each letter; while Saying the Sound of the letter.

er er er er er er er

er er er er er er er

er er er er er er er

Write the letter across each line, while Saying the Sound; be sure to use the proper letter formation

Blank handwriting lines for independent practice, consisting of a solid top line, a dashed midline, and a solid bottom line. There are four such sets of lines provided.

Lesson 15

Listen carefully and Write each of the letters, while Saying the Sounds on the lines below; be sure to use proper strokes.

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Letter-Sound Transfer:

Listen carefully to the words, then Unblend and spell each one on the lines below; be sure to use proper strokes.

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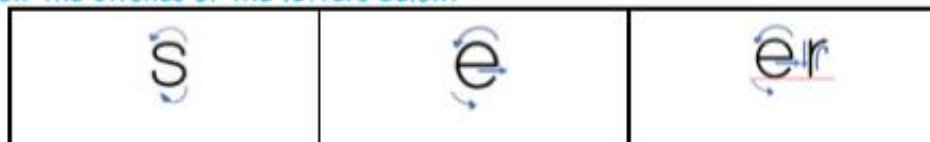
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Lesson 16

Letter Stroke Review:

Review the strokes of the letters below.



Write each of the letters across one line, while saying the sound of the letter. Be sure to **self-monitor** for proper stroke.

Handwriting practice lines for the letter stroke review. Each set consists of a solid top line, a dashed middle line, and a solid bottom line. There are four such sets of lines provided for practice.

Letter-Sound Practice:

Listen carefully and write each of the letters, while saying the sound of the letter. Be sure to **self-monitor** for proper stroke. *Put a star by your best letters!*

Handwriting practice lines for letter-sound practice. Each set consists of a solid top line, a dashed middle line, and a solid bottom line. There are four such sets of lines provided for practice.

Lesson 16

Letter-Sound Transfer:

Listen carefully to the words, then unblend and spell each one on the lines below; be sure to use proper strokes. Put a star by your best words!

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Listen carefully to the sentence, then unblend and spell the sentence on the lines below; be sure to use proper strokes.

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Fluency Training:

Grab your Handwriting Journal! Get ready to write!

APPENDIX D

WRITE SOUNDS TREATMENT FIDELITY CHECKLISTS

Write Sounds Fidelity Checklist: New Learning Lessons

Explicit Letter Stroke Instruction for 1st letter:

- instructor modeled correct letter formation
- instructor verbalized the corresponding letter sound while forming the letter
- instructor directed students' attention to their student book and the visual cues for the letter
- instructor prompted the students to verbalize the letter sound while writing the letter

Guided Letter-Sound Practice for 1st letter:

- students trace letter in their student book, while verbalizing the letter sound
- students write the letter in their student book, while verbalizing the letter sound
- instructor monitors closely and provides corrective feedback on letter formation

Independent Letter-Sound Practice for 1st letter:

- students write the letter in their student book, while verbalizing the letter sound
- instructor monitors closely and provides corrective feedback on letter formation

Explicit Letter Stroke Instruction for 2nd letter:

- instructor modeled correct letter formation
- instructor verbalized the corresponding letter sound while forming the letter
- instructor directed students' attention to their student book and the visual cues for the letter
- instructor prompted the students to verbalize the letter sound while writing the letter

Guided Letter-Sound Practice for 2nd letter:

- students trace letter in their student book, while verbalizing the letter sound
- students write the letter in their student book, while verbalizing the letter sound
- instructor monitors closely and provides corrective feedback on letter formation

Independent Letter-Sound Practice for 2nd letter:

- students write the letter in their student book, while verbalizing the letter sound
- instructor monitors closely and provides corrective feedback on letter formation

Explicit Letter Stroke Instruction for 3rd letter (if applicable):

- instructor modeled correct letter formation
- instructor verbalized the corresponding letter sound while forming the letter
- instructor directed students' attention to their student book and the visual cues for the letter
- instructor prompted the students to verbalize the letter sound while writing the letter

Guided Letter-Sound Practice for 3rd letter (if applicable):

- students trace letter in their student book, while verbalizing the letter sound
- students write the letter in their student book, while verbalizing the letter sound
- instructor monitors closely and provides corrective feedback on letter formation

Independent Letter-Sound Practice for 3rd letter (if applicable):

- students write the letter in their student book, while verbalizing the letter sound
- instructor monitors closely and provides corrective feedback on letter formation

Dictate Random Letter-Sound Practice:

- instructor calls out either the letter name or letter sound in random order
- students write the corresponding letter while verbalizing the sound
- instructor monitors closely and provides corrective feedback on letter formation

Letter-Sound Transfer:

_____instructor dictates high frequency word 1

_____students repeat high frequency word 1

_____students unblend high frequency word 1

_____students write high frequency word 1

— _____instructor dictates high frequency word 2

_____students repeat high frequency word 2

_____students unblend high frequency word 2

_____students write high frequency word 2

_____instructor dictates high frequency word 3

_____students repeat high frequency word 3

_____students unblend high frequency word 3

_____students write high frequency word 3

Write Sounds Fidelity Checklist: Cumulative Review Lessons

Review Letter Stroke Instruction for 1st letter:

- _____ instructor modeled correct letter formation, while verbalizing the sounds of all letters learned on A day
- _____ students write the letters while verbalizing the corresponding letter sound in their student books
- _____ instructor monitors closely and provides corrective feedback on letter formation

Dictate Independent Letter-Sound Practice:

- _____ instructor dictates set of learned letters or sounds
- _____ students write the letters in their student book, while verbalizing the letter sounds
- _____ instructor monitors closely and provides corrective feedback on letter formation
- _____ students self-monitor and draw a star next to each correctly formed letter
- _____ students color in their graph for each starred letter

Dictate Random Letter-Sound Practice:

- _____ instructor calls out either the letter name or letter sound in random order
- _____ students write the corresponding letter while verbalizing the sound
- _____ instructor monitors closely and provides corrective feedback on letter formation

Letter-Sound Transfer:

- _____ instructor dictates high frequency word 1
- _____ students repeat high frequency word 1
- _____ students unblend high frequency word 1
- _____ students write high frequency word 1
- _____ instructor dictates high frequency word 2
- _____ students repeat high frequency word 2
- _____ students unblend high frequency word 2
- _____ students write high frequency word 2
- _____ instructor dictates high frequency word 3
- _____ students repeat high frequency word 3
- _____ students unblend high frequency word 3
- _____ students write high frequency word 3
- _____ students self-monitor and draw a star next to each correctly formed word
- _____ instructor dictates the phrase or sentence provided
- _____ students repeat the phrase or sentence aloud
- _____ students write the sentence in their student book

Fluency Training:

- _____ instructor directs students to write the phrase/sentence at the top of their fluency notebook and give directions to copy the sentence as many times as they can in two-min
- _____ students copied the phrase/sentence for a two-min time period