



Zaner-Bloser Handwriting **Foundational Research Paper**

RESEARCH-BASED DESIGN & LOGIC MODEL



Zaner-Bloser Handwriting engages students to develop efficient, legible, and automatic handwriting skills, critically supporting the development of written communication and expression necessary for building community, curiosity, and confidence in learning.

Zaner-Bloser Handwriting

Foundational Research Guide:

Research-based Design of *Zaner-Bloser Handwriting*

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Outline

- I. How Can This Research Foundations Paper Be Used?
- II. Key Points
- III. Why Does Handwriting Instruction Matter?
- IV. *Zaner-Bloser Handwriting* Logic Model
- V. The Goal of *Zaner-Bloser Handwriting* Instruction
 - A. Short-Term Outcomes: Enabling efficient, legible, and automatic written communication
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- VI. How Does *Zaner-Bloser Handwriting* Help Students Learn? Each section includes a definition, a summary, and a deep dive into the topic.
 - A. **Engagement**: students positively engage with the learning opportunities
 - B. **Efficiency**: students access and integrate the skills needed to accurately and automatically use script to write by hand
 - C. **Legibility**: students produce handwriting that is easy to read and is appropriate for the requirements and spatial demands of the task
 - D. **Automaticity**: students generate script with ease
- VII. Ready to Improve Your Students' Handwriting?



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Research-Based Design Certification.*

How Can This Research Foundations Paper Be Used?

Zaner-Bloser Handwriting is built on evidence-based strategies to make instruction effective. This paper aims to outline the research foundations of the *Zaner-Bloser Handwriting* program. The paper can be used as a starting point for conversations about the importance of handwriting instruction, the research-based methods that inform the program's design, and the links between effective handwriting instruction and positive student outcomes. The following sections describe how *Zaner-Bloser Handwriting* was designed and why it works. Each section details how *Zaner-Bloser Handwriting* engages students in developing efficient, legible, and automatic handwriting skills, enabling written communication and increasing access to building community, curiosity, and confidence in learning.

Key Points

- In our digital age, it's tempting to see handwriting as optional. However, **handwriting is one of the key foundational skills for literacy development** that supports students' ability to translate ideas into written words and participate in writing tasks in and outside school.
- Handwriting instruction at an early age **supports the reading brain**. The practice of forming letters helps students recognize letters when reading.
- *Zaner-Bloser Handwriting* promotes student **engagement** by providing interactive learning opportunities incorporating technology integration, embedding motivational support, and helping facilitate a home-to-school connection.
- *Zaner-Bloser Handwriting* teaches students to write **efficiently** by providing explicit, direct instruction, as well as added scaffolding for students who need extra support. Letters are grouped by formation characteristics to accelerate learning acquisition.
- *Zaner-Bloser Handwriting* helps students learn to write **legibly** by providing success criteria through the Keys to Legibility. The Keys allow students to self-correct, support each other's work, and access specific and targeted feedback.
- *Zaner-Bloser Handwriting* supports students in forming letters with **automaticity** by providing cognitive-science-based strategies for practice, including spaced practice and interleaving, which improve retention better than other methods.
- By writing efficiently, legibly, and automatically as young learners, students will be **better equipped to express their ideas, opinions, and stories**, increasing access to building community, curiosity, and confidence in learning.

Why Does Handwriting Instruction Matter?

In our digital age, it's tempting to see handwriting as optional. However, handwriting is still a key foundational skill for literacy development. Handwriting success supports students' reading, spelling, and written communication for the rest of their lives. The very act of handwriting activates the language areas of the brain, demonstrating a link between handwriting and other aspects of language learning (James & Engelhardt, 2012; James, 2017; Vinci-Booher et al., 2019). Handwriting also helps set up and strengthen brain systems that play a role in reading acquisition (James, 2010; Vinci-Booher & James, 2020, 2021; Zemlock et al., 2018). Notably, handwriting ability relates to both students' ability to compose fluent and coherent texts (Graham et al., 2000) and their ability to read (James et al., 2016; Wolf & Berninger, 2018).

Instruction in handwriting includes the critical practice opportunities necessary to build strong fine motor skills related to improved performance in literacy tasks such as letter writing and math (Dinehart et al., 2014). In addition, strong handwriting skills as a young learner are associated with ongoing reading and math achievement at least as late as fifth grade (Dinehart et al., 2014). Assessing and understanding children's handwriting skills can help identify other learning difficulties (Berninger & Wolf, 2016) to help students get the support they need. Further, systematic handwriting instruction may reduce the number of children referred to special education services, as handwriting is closely connected to reading, writing, and achievement across content areas (Berninger & Wolf, 2016). Research also suggests that facilitating handwriting instruction with technology can ultimately improve legibility and keyboarding skills (Santangelo & Graham, 2016), which impact students far beyond their performance in the classroom.

Explicit handwriting instruction can ease one of the earliest constraints on writing ability (Graham, 2009). Strong handwriting makes communicating through writing easier because students can focus more on expressing their ideas than on letter formation (Graham et al., 2015). Handwriting skills connect to short-term and long-term impacts on student achievement and skill development (Graham et al., 2000). Given the link between handwriting and brain development (e.g., James, 2010; Vinci-Booher & James, 2020, 2021; Zemlock et al., 2018), reading success (e.g., James et al., 2016; Wolf & Berninger, 2018), and continued learning in other content areas (e.g., Dinehart, 2014), handwriting instruction is critical. In addition, while handwriting instruction is vital, it only requires a small amount of instructional time—doses of about 15 minutes of instruction and an additional 5 minutes to compose are effective at supporting handwriting development (Berninger et al., 1997, 2008).

Logic Model for Zaner-Bloser Handwriting

PROBLEM STATEMENT

Most classroom reading programs are missing the explicit instruction required for students to learn how to form letters and build the skills needed to write fluently. Zaner-Bloser provides handwriting resources that include instruction, practice, and assessment that empower students to master penmanship while simultaneously fostering confidence in written expression.

RESOURCES

What resources are available?

- Dedicated and focused letter formation and handwriting lessons
- Expert-developed learning content focused on basic penmanship, cursive, and Spanish-focused curricula
- MyZBPortal.com, a reporting dashboard with student performance and completion information
- Teacher training materials aligned with the curriculum
- Student-facing Digital Tutor, with QR codes to access anywhere, anytime

STRATEGIES & ACTIVITIES

What will the activities, events, and such be?

- Teachers use a structured, sequential approach to handwriting, which includes clustering related letters for ease of learning
- Teachers maximizing instructional time by combining instruction and independent practice, completing lessons in 15 minutes or less
- Teachers refer to MyZBPortal.com to plan instruction for those who struggled during the lessons
- Teachers use training materials that incorporate *Zaner-Bloser Handwriting* into the curriculum
- Teachers access materials aligned with their curriculum on the topics they need when they need
- Students leverage interleaved practice and self-evaluating handwriting
- Students scan the Digital Tutor QR codes as needed, to see how letters are written and then re-creating them independently

OUTPUTS

What are the initial products of these activities?

- Classrooms will have more:
- Engaging lessons that are interactive and motivating
 - Efficient introduction to handwriting processes
 - Effective self-evaluation of handwriting legibility
 - Practice with automaticity of handwriting
 - Literacy-aligned activities that include writing
 - Opportunities for writing with support and feedback
 - Opportunities to practice handwriting at home

SHORT-TERM AND INTERMEDIATE OUTCOMES

- Students can write letters, words, and phrases legibly.
- Students build more automaticity in their handwriting skill through practice.
- Teachers can provide effective feedback for learners to help them improve.
- Students build self-evaluation skills to assess their handwriting for quality of letter formation.
- Students and others see improvement of their overall handwriting quality.
- Students increase their confidence in their handwriting and writing quality.
- Caregivers can support their students' writing at home, fostering home-to-school connections.
- Improved handwriting skills enables the student to express themselves with more ease in writing.

LONG-TERM OUTCOMES AND IMPACTS

- Students can extend their handwriting skill to other content areas, such as taking notes in science or math.
- Strong foundational handwriting skills help students have more opportunities to express themselves confidently.
- Legible handwriting helps others read and understand their ideas, opening the door for more opportunities to share and receive ideas through the exchange of written information.
- Writing skills boost students' ability to form social connections and build community across space and time.
- Automatic handwriting helps make it possible for students to write about their interests and thoughts, providing more opportunities to express their curiosity.

ASSUMPTIONS

- Leaders believe that letter formation is an important skill that should be explicitly taught.
- Time is provided in the school day for the instruction of letter formation.
- Access to a device, such as a laptop
- Access to the internet

Short-Term Outcomes:

Zaner-Bloser Handwriting helps build handwriting skills foundational for written communication. Students learn how to form letters and words on paper, as well as how to evaluate to improve their skills. *Zaner-Bloser Handwriting* propels students from emerging toward becoming proficient writers, strengthening their ability to communicate confidently.



Long-Term Outcomes:

Students with foundational writing skills have increased access to opportunities that build community, curiosity, and confidence in learning. By writing efficiently, legibly, and automatically, students can craft a signature of their name, take notes during important conversations, send letters to loved ones, or journal their thoughts or curiosities in their notebooks. Handwriting skills support students in engaging in writing tasks with greater ease, which is vital for giving them the power to put their thoughts on paper and build understanding with others. As a foundational literacy skill, handwriting skill supports the potential for students to share opinions and ideas, tell their own stories, and engage with a community of learners throughout time.



How Does *Zaner-Bloser Handwriting* Help Students Learn to Write?

Zaner-Bloser Handwriting instructs students on how to write through explicit and systematic instruction that is interactive and playful while engaging students' curiosity. *Zaner-Bloser Handwriting* focuses on incremental improvements, providing a low-risk, step-wise instructional approach that allows students to pause during learning moments. *Zaner-Bloser Handwriting* follows a developmentally appropriate stroke sequence, using simple yet academic language, and incorporates learning sciences best practices. The small and gradual steps in the progression guide students' skill-building so that they have many successes—students aren't asked to do something if they aren't ready. Across multiple opportunities, students apply their knowledge, building and improving within and across lessons.

Proficient handwriting allows students to communicate fluently and automatically. Being able to write provides students the power to share ideas and allow others to understand them, giving them the tools to share and receive others' opinions.

Zaner-Bloser Handwriting engages students to write **efficiently**, **legibly**, and **automatically** to help build community, curiosity, and confidence in student learning.

Engaging Students in Learning

Why Does Engagement in Learning Matter?

How much students are engaged during lessons plays an important role in the knowledge change processes associated with learning, with interactive engagement promoting the greatest knowledge change (Chi & Wylie, 2014; Chi et al., 2018). When this interaction extends outside the classroom to the home environment, students show benefits to their learning (Galindo & Sheldon, 2012). Engagement also helps motivate students to exercise curiosity beyond the classroom (Ryan & Deci, 2000).

How Does Zaner-Bloser ENGAGE Students in Learning?

Zaner-Bloser Handwriting promotes engagement in learning by providing interactive learning opportunities through multisensory materials and technology integration. The program also fosters home-to-school connections and provides embedded motivational support to encourage learners to continue developing their skills beyond the classroom. Through *Zaner-Bloser Handwriting*, students can positively engage with others as they grow their handwriting proficiency.

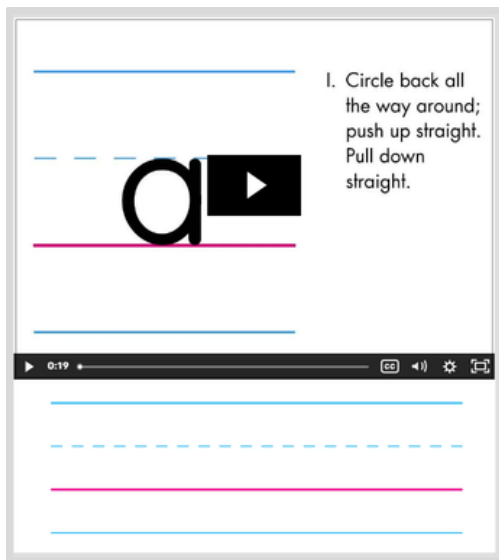
DEEP DIVE INTO ENGAGEMENT

Interactive learning is central to the design of *Zaner-Bloser Handwriting*. Students take the reins in their handwriting journey. Zaney, a cartoon pencil guide, along with the Digital Tutors and models with guidelines set students up for success. The program gives students the tools to evaluate their own work, increasing their agency in their learning. The Stop and Check feature encourages students to use the Keys to Legibility to check their work. The model spirals through a Write-Review-Apply-Evaluate cycle throughout the lessons. This predictable routine integrates multisensory activities that focus



on each of the Keys while bolstering engagement. Skywriting is one interactive activity in *Zaner-Bloser Handwriting* where students draw letters in the air and engage their whole body in the learning process. This practice is beneficial for learning to write (Wolf & Berninger, 2018) and for teachers to gauge students' understanding quickly. Teachers can use videos from MyZBPortal.com for initial introductions to letters. Then teachers have a wide range of ancillary materials for engagement and additional practice, including touch and trace cards, alphabet strips, write-on/wipe-off practice boards, and writing frames supporting proper pencil grips. These tools are designed to help students learn in multiple modalities that engage their senses simultaneously, helping them integrate information across the senses during learning (Farrell & Cushen White, 2018; Shams & Seitz, 2008; Wolf & Berninger, 2018).

Zaner-Bloser Handwriting integrates technology with other instructional materials, allowing students to extend their online learning experience. The Handwriting Quest in MyZBPortal.com allows students to interactively track their progress from tracing to freewriting. Students complete each quest by self-selecting their best work and pinning it for review. Technology integration in handwriting instruction has shown the potential

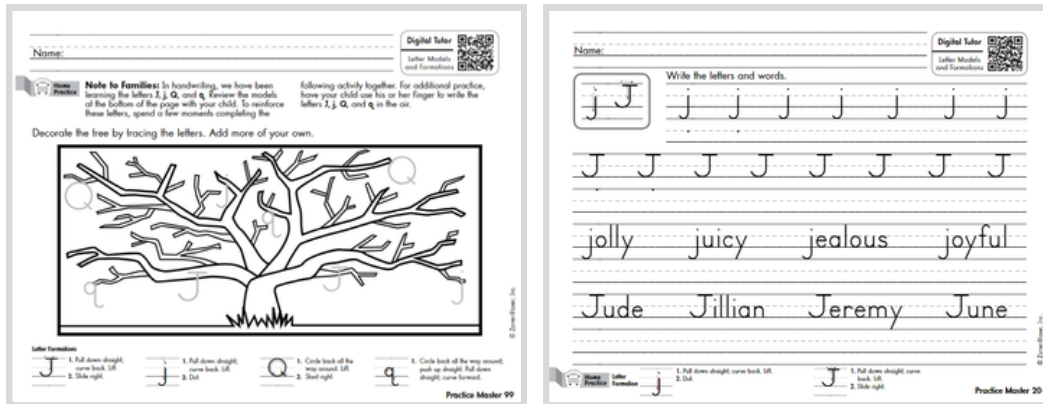


to support handwriting development (Pulido & Thériault, 2022; Santangelo & Graham, 2016).

Digital Tutor QR codes are included on lessons and worksheets to promote interaction with materials across different platforms. Scanning these codes with a mobile device provides access to instructional videos to help students learn the basics of handwriting and how to write letters and numerals. These videos can be used alongside lessons or as a review. The QR codes for these animated letter models allow students, teachers, or caregivers to scan and open materials on various devices, allowing students to interact with materials across platforms, at school, or home.

Home-to-school connections are facilitated through this technology integration and home handwriting packs, allowing students to learn beyond the classroom. Supporting the transfer of learning from school to home can help students experience greater learning benefits and promote student achievement gains (Anderson, 2000; Galindo & Sheldon, 2012). Having packs that can be sent home to engage students with their caregivers is an effective way to build this home-to-school connection (Zeece & Wallace, 2009). *Zaner-Bloser Handwriting* includes the Home Handwriting Pack, which includes an alphabet poster, handwriting activities, and illustrations of writing positions.

Zaner-Bloser Handwriting also has Practice Masters available for every letter and optional home practice pages for students to review and continue learning. *Zaner-Bloser Handwriting* materials allow students to practice at home and provide caregivers with resources to extend students' learning outside school settings. Fostering these at-home connections can help students see the value of handwriting beyond the classroom (Gerde et al., 2012).



Motivational supports are embedded within *Zaner-Bloser Handwriting* to encourage students to continue in their learning efforts. According to the Self-Determination Theory, students are more motivated when they feel autonomous, competent, and connected while learning (Ryan & Deci, 2000). The explicit, systematic approach of *Zaner-Bloser Handwriting* bolsters competence in handwriting and is intentionally designed to promote students' autonomy and advance their skills. *Zaner-Bloser Handwriting's* clear instructional routines are designed to support their autonomy as they develop and grow their handwriting skills. During Handwriting Quest, students navigate through the content and are given choices on how to use online practice time.

Students self-reflect and evaluate their handwriting with each practice activity. For example, students can choose their best letters to display, allowing them to celebrate their improved competence with their class and caregivers. Knowing the criteria for success and how to evaluate their current skill level increases their speed of growth, therefore feeding motivation to continue toward their goals.

Relevant exercises challenge students to use handwriting in meaningful contexts, across disciplines, and in different writing styles and types of text. Students are encouraged to make connections to content outside the lessons as their handwriting skills progress across units. For example, during a lesson's skill practice, students are prompted to contribute to stories by adding the next line of dialogue or share their ideas by coming up with their own tongue twisters. These are moments when young children are participating in a writing community—it's nearly impossible not to ask your neighbor what tongue twister they came up with!

Helping Students Write Efficiently

Why Do Students Need to Be Directly Taught Handwriting?

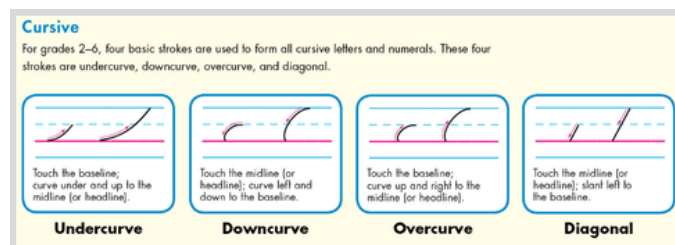
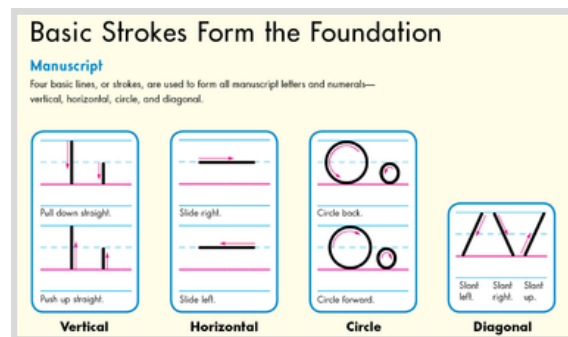
In addition to being engaged while learning, students need quality instruction that helps them learn how to write efficiently. The best way to support handwriting development is to teach it directly (Sheffield, 1996). Attention and working memory are limited resources as students process and learn new information. Content provided in clear, short chunks can help students learn more effectively by reducing the cognitive load on working memory (Alloway, 2006). Explicit instruction is central to effective learning across domains, and handwriting is no exception (Archer & Hughes, 2016).

How Zaner-Bloser Teaches Students to Write EFFICIENTLY:

Zaner-Bloser Handwriting helps students write efficiently by providing explicit and direct instruction and scaffolding for students who need extra support. Letters are grouped by formation characteristics to accelerate learning acquisition by building and strengthening muscle memory.

DEEP DIVE INTO EFFICIENCY

Zaner-Bloser Handwriting follows a **systematic scope and sequence** to help students learn to write efficiently. Lessons present letters of the alphabet in groups based on common strokes, formation patterns, and visual attributes that letters share. By chunking the letters, children learn all the letters in a fraction of the time (Jones, Clark, & Reutzel, 2012). The instruction and practice are organized and segmented by the four basic lines, or strokes, to form all letters and numerals. For manuscript



instruction, lessons focus on teaching vertical, horizontal, circle, and diagonal lines. For cursive instruction, lessons focus on teaching undercurve, downcurve, overcurve, and diagonal strokes. Cursive letters are also taught as

lowercase first and then uppercase. Breaking lessons into small chunks helps students more effectively direct their attention during learning (Weinstein et al., 2019). By grouping letters according to common features, students can see the similarities and connections between letters. For example, the letter *a* is presented with other letters that share similar strokes. By presenting the letter *a* with other letters that contain backward circle lines, such as *o* and *d*, students are able to see patterns and learn to write letters correctly and efficiently. Delivering lessons in reasonably-sized segments helps ensure that students do not get overwhelmed by too much content at once but can focus their attention on the lesson and engage with the material.

Across units, *Zaner-Bloser Handwriting* follows an **explicit Model-Practice-Evaluate learning routine**. Starting the lessons with modeling helps clarify the writing process for children, an important step in effective early writing instruction (Archer & Hughes, 2016; Gerde et al., 2012). Each unit contains “Write” pages, which present the explicit instructional approach for the teacher to use in delivering instruction to students. For each letter, instruction begins with modeling. Teachers can model letter formations to the whole class using the Zaner-Bloser animated letter models and engaging the class in skywriting. Students are given explicit, direct instruction about how to form letters in straightforward, academic language. “Pull down” or “pull up” are the directives given to students for vertical lines, telling them exactly how to move their pencil to practice creating the desired shape before moving to the more challenging task of producing entire letters. After teachers model letter formations, students practice letters on their own, and teachers and students both engage in the evaluation process. The Keys to Legibility helps to evaluate if student work matches the shape provided in models, touches the appropriate lines to have a consistent size, is spaced out evenly within a word, and sits straight up and down on the lines. The Keys help teachers deliver consistent instruction and know what aspects to look for in their students’ handwriting. This learning routine helps provide continuity across lessons.



The direct, systematic instruction and routine of modeling and practice in *Zaner-Bloser Handwriting* helps students learn to write efficiently. The structure and routine of the lessons help students devote their working memory and cognitive resources to building skills as well as making connections across similar letter types. Providing lessons in chunks with clear directions for success sets students up with the foundational components of handwriting so that they can go on to write legibly and eventually automatically.

Helping Students Write Legibly

Why Do Students Need to Write Legibly?

Developing legible handwriting requires opportunities to practice and receive explicit, corrective feedback so that they can improve (Graham et al., 2015). Legible handwriting is important because handwriting is often taken as a reflection of a student's ideas. When students have poor handwriting, readers often assume they do not have good ideas or perceive them more negatively (Graham et al., 2015). This can mean that students' ideas are discounted before they are even considered, which has the potential to hold them back from other opportunities that they would otherwise be qualified for.

How Zaner-Bloser Helps Students Write LEGIBLY

Zaner-Bloser Handwriting helps students write legibly by providing success criteria through the Keys to Legibility that allow for students to intentionally practice, self-correct, and support each other's work, as well as allow for an assessment system that includes specific and targeted feedback.

DEEP DIVE INTO LEGIBILITY

Zaner-Bloser Handwriting focuses on practice and feedback for legibility at its core. The lessons provide opportunities for students to practice and get feedback at every turn,

Manuscript Keys to Legibility
Make your writing easy to read.

Shape
Letters with good shape are easy to read. Trace these letters.

Manuscript letters are made from the basic strokes. Good strokes make letters with good shape.

- ✓ Circle a letter that has a vertical line (l).
- ✓ Underline a letter that has a horizontal line (—).
- ✓ Draw a box around a letter that has a circle line (o c o).
- ✓ Draw a star beside a letter that has a diagonal line (n /).

Size
Letters with good size are easy to read. Trace these letters.

Tall letters touch the headline.
Short letters touch the midline.
Letters with descenders go below the baseline and touch the next headline.

- ✓ Circle a short letter.
- ✓ Underline a tall letter.
- ✓ Draw a box around a letter with a descender.

8 • Unit 1

which is especially important for handwriting development (López-Escribano et al., 2022). Practicing strokes helps students know how it feels to form each letter and build muscle memory (Asher, 2006; Palmis et al., 2019). *Zaner-Bloser Handwriting* also helps teachers give students specific, actionable feedback to help students understand how they can progress (Hattie & Temperly, 2007). The Keys to Legibility serve as a set of success criteria

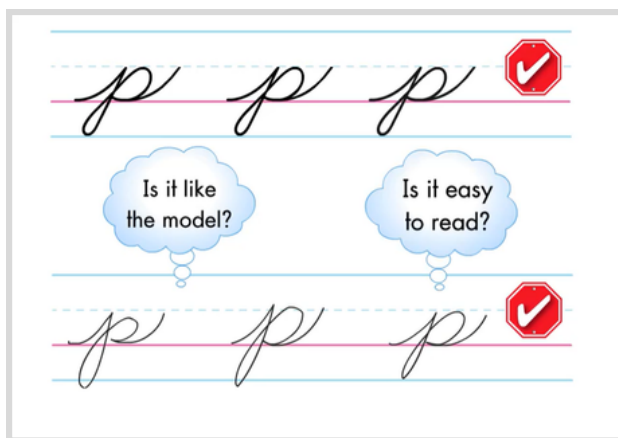
that help students and teachers align on important features of legible handwriting, such

as letter size, slant, and spacing. For example, teachers can prompt students to check features of their writing, such as “Is the slide right stroke of your *A* on the midline?” and “Does your *e* look round?” to help students understand what makes writing legible. These Keys to Legibility help promote legible handwriting by outlining a benchmark and a roadmap to strong handwriting.

The Keys to Legibility provide the foundation for evaluating how students progress in their handwriting skills. *Zaner-Bloser Handwriting* includes pretests and posttests at the beginning (Unit 1) and end of the year (Unit 4) that help teachers understand where students are in their skill development and cater instruction as needed. Across all units, students have opportunities to practice writing new letters on the “Write” pages, along with an interleaved review of previous letter formations on “Review” pages. These pages provide informal opportunities during units for teachers to check in on their students’ letter formations and understanding of the lessons. Evaluation rubrics for manuscript and cursive are also included to help teachers assess student learning (see Printables for students in MyZBPortal.com).

Manuscript Evaluation Rubric

	Proficient Score 4 points.	Satisfactory Score 3 points.	Developing Score 2 points.	Emergent Score 1 point.
Shape	All of the letters are the Zaner-Bloser style.	Most of the letters are the Zaner-Bloser style.	Some of the letters are the Zaner-Bloser style.	None of the letters are the Zaner-Bloser style.
Size	All of the letters are the appropriate size and touch the appropriate lines.	Most of the letters are the appropriate size and touch the appropriate lines.	Some of the letters are the appropriate size and touch the appropriate lines.	None of the letters are the appropriate size or touch the appropriate lines.
Spacing	All spacing between the letters and words is appropriate.	Most spacing between the letters and words is appropriate.	Some spacing between the letters and words is appropriate.	Spacing between the letters and words is not appropriate throughout.
Slant	All of the letters are straight up and down.	Most of the letters are straight up and down.	Some of the letters are straight up and down.	None of the letters are straight up and down.

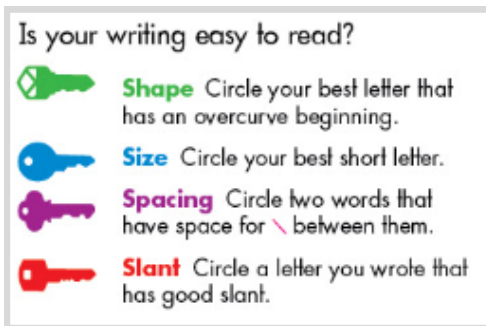


Zaner-Bloser Handwriting includes clear success criteria to promote opportunities for students to self-review their work in addition to receiving teacher feedback. The program includes built-in prompts for students to evaluate their writing overall, with prompts asking if students can read their writing easily and opportunities for them to explain why they think so (or why not). Encouraging children to read what

they wrote and review their work is an effective way to support the connection between reading and writing (Gerde et al., 2012). The “Stop and Check” prompts throughout the

lessons are intended for students to learn how to evaluate their work and develop academic practices tied to self-awareness and self-management skills. These prompts allow students to review their work and make revisions before progressing or submitting their work for review. Prompts for self-evaluation help students develop stronger skills and learn to self-regulate their learning (Dent & Koenka, 2016; Schunk & Zimmerman, 2007). Self-evaluation is key to building confidence and helping students take ownership of their learning.

Through feedback, clear success criteria, and practice with self-evaluation, students using *Zaner-Bloser Handwriting* can develop their skills so that their handwriting is legible and easy to read. *Zaner-Bloser Handwriting* helps students learn to write legibly so that those who read their work can focus on the content and quality of their ideas, rather than on the physical appearance of their handwriting.



Helping Students Write Automatically

Why Do Students Need to Develop Handwriting Automaticity?

When students improve their handwriting skills, handwriting becomes more effortless. With increased automaticity, students don't have to devote as much effort and attention to the physical task of writing and can instead spend more of their effort on developing the ideas they want to communicate in their writing (Graham et al., 2012). How much attention a child has to pay to form letter strokes can even affect the quality of the content in writing produced by early elementary students (Schwellnus et al., 2012), and this effect lasts throughout elementary school and even on to high school (Limpo et al., 2017; Limpo & Graham, 2019; Pulido & Thériault, 2022). Automaticity in handwriting allows students to shift to focusing their efforts on thinking about and communicating their ideas with others and expressing themselves rather than individual letter formation.

“Skilled writers rarely think about handwriting, typing, or spelling, executing each skill correctly and with little to no conscious attention.”

– Graham et al., 2015

Beyond writing quality, automaticity in handwriting can help with other learning processes. Children with better handwriting show evidence of more automatic and streamlined brain activation during reading (Gimenez et al., 2014). Producing each letter helps support perception—stroke-by-stroke letter learning increases the ease of recalling letters for reading and spelling (Longcamp et al., 2017). Further, just the mindful practice of handwriting can lead to improvements in executive function, inhibitory control, and school readiness (Diamond, 2000). Automaticity is, therefore, important for continued skill-building across development.

How Zaner-Bloser Helps Students Write AUTOMATICALLY

Zaner-Bloser Handwriting engages students to develop efficient, legible, and automatic handwriting skills, critically supporting the development of written communication and expression necessary for building community, curiosity, and confidence in learning.

DEEP DIVE INTO AUTOMATICITY

Zaner-Bloser Handwriting embeds many opportunities for practice in the program, recognizing the connection between practice and automaticity. Students need repeated practice that is spaced across time and interleaves old skills with new skills to support retention (Dunlosky et al., 2013). Review is built into ongoing practice in *Zaner-Bloser Handwriting*, spiraling old skills into new lessons. Students start with simple strokes, such as vertical lines, with letters such as *L* and *T* before moving to more complex strokes, such as curved and diagonal lines (Jones et al., 2012). Later, as students move to practice curved letters, they get additional practice with vertical strokes while learning new forward circle and backward circle strokes, such as when practicing *d* and *p*. This interleaving of practice with old, acquired skills with new skills helps students progress in their handwriting skills and supports retention.

The way Zaner-Bloser Handwriting interleaves old skills with new skills also allows for distributed practice, which is better for handwriting development than massed practice (Graham, 2009). Massed practice involves practicing a new skill or learning a large amount of information in a short time frame, such as cramming for an exam the night before. Distributed practice, or practice that occurs across multiple sessions over a longer period of time, allows for breaks between practicing, which helps facilitate retention and skill development (Graham, 2009).

In *Zaner-Bloser Handwriting*, after teachers provide modeling of handwriting and guided practice scaffolding through self-evaluation prompts, students complete independent practice. Incorporating a routine of guided and independent practice into lessons is an effective instructional method based on cognitive principles of learning (Rosenshine, 2012). These independent practice opportunities allow students to try applying their knowledge and skills on their own and in new ways. Each grade level in *Zaner-Bloser Handwriting* comes with activities that provide relevant independent practice for handwriting in different application contexts. For example, on MyZBPortal.com, first graders will find an activity that involves them finishing the lines on a pizza, enforcing the movement of the forward circle stroke in a lighthearted way. In their first-grade materials, students are challenged to take on an informative writing piece by considering an activity they perform well and listing the steps. Fourth graders have the opportunity to write an opinion piece about their preference between math and science; the directions include quick reminders about indenting and call for students to use supporting reasons in their answers.

Encouraging students to engage in writing practice through applied activities such as these is more important for children's writing development than focusing only on correct letter formation, because practicing writing in a variety of activities helps students generalize across tasks (Gerde et al., 2012). The opportunities for repeated practice throughout *Zaner-Bloser Handwriting* help students develop automaticity in their writing, so they can think less about the individual letters they are forming and more about the ideas they want to share.



Ready to Improve Your Students' Handwriting?

Use these questions to reflect on your current practice, considering the research featured in this paper.

- How do you currently teach handwriting?
- Are your students engaged in interactive and motivating handwriting activities?
- Do your lessons provide an efficient introduction to handwriting?
- How do you help your students learn to effectively evaluate their handwriting?
- Are your students developing more automatic handwriting?
- Do your handwriting activities connect across content areas?
- Are students provided with writing support and clear feedback?
- Do your students have opportunities to practice handwriting across contexts, including at home?

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