

Introduction

Inviting Students to Be Strong Writers

As students transition from their early years of schooling to young adolescence, a rush of new emotions and thoughts leads them into a period of exploration and uncertainty. They yearn to fit in and find meaning in their lives, they question their places in the world—and they can easily become self-absorbed.

By no means is this transitional process bad. Self-examination is an important part of growing up, and it is at the heart of this book. The activities in *Building Strong Writers in Middle School* invite students to look inward before expressing their feelings or insights externally. Time and again, we have witnessed students respond in absolutely remarkable ways to assignments that feel personal to them. Not only have our students impressed us with their work, they often have astounded themselves with their creations. We wrote this book because we want your students to share these successes, too.

The Inviting Ways of Invitational Education

Tapping into your students' desire to express themselves is one part of building strong writers in middle school. When done as part of a larger effort to invite students to realize their potential, we see it is the *students* who do the building, not us. This is called invitational education.

William Purkey described his theory of invitational teaching and learning in his 1978 book *Inviting School Success: A Self-Concept Approach to Teaching and Learning*, which he coauthored with John Novak. Still relevant today, invitational

education is, in essence, a learning culture in which people are “cordially, creatively, and consistently summoned to realize their potential.”

Teachers can do this by setting classroom rules and procedures that are respectful in nature—for instance, more “here’s what will happen if you behave” instead of “here’s your punishment if you misbehave” statements. Or, in designing curriculum, teachers can first ask themselves, “What options will I provide for my students who either excel at or struggle with this concept?” and then design specific activities that accommodate these students’ varied rates of learning. Thus, by personalizing learning, we tell students we value their differences and are willing to support them as they discover their talents and interests.

Invitational education is anchored in five principles:

- respect (believing your students are valuable and capable)
- trust (believing education is a cooperative and collaborative process)
- care (believing the process is as important as the product)
- optimism (believing that students will respond and can succeed)
- intentionality (deliberately looking for ways to invite students to realize their potential)

In essence, an “Intentional Inviter” is someone who designs a culture of learning that is respectful and learning activities that are individually challenging and meaningful for students. The idea of invitational teaching and learning is

simple, really, and we made it the basis of our classroom actions—and of the activities in this book.

Using This Book

Building Strong Writers in Middle School is divided into four sections, each containing activities that invite your students to create writing samples that vary in content, style, and length. The first section, “Writing to Get to Know Each Other,” contains short activities that will help students introduce themselves to their classmates and vice versa. Most will not require much research beyond students exploring their own ideas or those of family members. Many of this section’s activities are best done near the beginning of the school year, or at any other time when you want your students to understand one another more deeply.

The second section, “Writing to Understand Ourselves,” requires more intensive and extensive writing from students: “Intensive” in the sense that students will need to explore their personal beliefs and ideas in completing their assignments, and “extensive” meaning more than one classroom session (or work completed as homework) will be required to finish the activities. These assignments work best once your students are already acquainted with one another, since a level of mutual trust among students will likely allow them to be more candid and open in their responses.

“Writing to Make a Difference,” the book’s third section, includes activities in which students embrace the larger world by acknowledging people who have impacted their lives and/or sharing their finished products with others who may be positively affected by the projects. These activities can be completed whenever, although some teachers prefer to use them in close proximity to holidays, when being thankful or reflective is often a part of holiday festivities.

The book’s fourth section, “Writing to Create Art,” includes activities that use a visual motif as well as a written one in the final student product. As with many of the other activities in this book, students are asked to be introspective and write about issues or topics of personal importance to them. This section’s activities involve a form of literary expression (such as fiction, poetry, and song lyrics), so you may want to undertake these activities at any time during the school year when literature is being studied or simply when you want your students to take a break from their more formal essays, book reports, or extended responses.

Each activity begins with a brief introduction that provides summary and background for the activity. This serves as a way to get a quick handle on the theme and content of the activity. This is followed by the recommended product students will produce, the materials needed to conduct the activity, the time required, and the Common Core State Standards the activity meets (see the corresponding standards chart on page 5). Of course, you may always alter the product based on your students’ interests and creativity and your desire to differentiate instruction.

Each activity has three basic steps:

- **The Hook.** This is an engaging way to get students interested in the activity you are about to introduce.
- **Introduce the Activity.** In this step, you’ll explain the requirements of the activity and answer any questions students have.
- **Invite Students to Complete Their Own Responses.** This section may contain step-by-step instructions on administering the activity, including, when appropriate, walking you through the stages of drafting, revising, and “publishing,” or sharing final products with an audience (often just the class).

Each activity ends with three types of extensions:

- **Classroom Extensions.** Get greater value out of the activity by modifying or expanding it with your students.
- **School Extensions.** Get your whole grade, team, or school involved by opening up the activity in ways that include other students and staff.
- **Family Extensions.** Invite families to be part of the project, and learn from each other by asking them to participate in the activities.

Every activity includes sample assignments written by our students that you may use as models to introduce the activity to your students. We suggest projecting these from your computer onto a screen or interactive white board, using a document camera to project a printout, or creating a transparency. The student samples we have included reflect high-quality writing. While not every one of our students produced work of this caliber (which may also be the case in your classroom), we believe these exemplars may spur your students to create written products that show sophisticated and deep thinking. In the materials list, such items are referred to as “display copies.”

A Word About Holistic Evaluation

We are cognizant of the many ways in which students might be assessed in terms of their growth as writers as well as meeting the standards for their particular grade levels. We recognize that assessment is an area of much debate and continued research, so we leave it to you, the teacher, to establish how your students should be evaluated in conjunction with your school’s curriculum and expectations. Our recommendation, however, is holistic evaluation.

Holistic evaluation asks the teacher and student to be partners in making sure that the

work submitted is meaningful to the person who wrote it and understandable to those who read it, while simultaneously meeting the goals and intended outcomes of the activity. If a piece of work is not as strong or clear as it might be, a holistic evaluator would return it to the student with specific questions and comments designed to strengthen the content, such as, “You went from not making the team in fifth grade to being team captain in seventh grade. What happened that made the difference?” If the grammar, syntax, or sentence structure is confusing, explain to the student that off-the-mark mechanics take away from the story’s power and interfere with its flow. Then, ask the student to try to find some errors independently, or ask if she or he needs help from you or a classmate to do so.

If a student submission has some especially strong aspects to it, it is important to comment on them, as students need to understand their strengths and be prepared to replicate them in future writings. When students merely get an “A” or a “Great job,” they cannot differentiate between strengths and weaknesses in their writing. It’s also beneficial for students to read one another’s work in pairs or small groups, providing compliments and suggestions for improvement. Guiding discussion topics such as the following can greatly assist students in their peer discussions:

- This is what I really like about this piece of writing.
- This is one part that confused me.
- I think you can make your writing stronger by . . .

As teachers, of course we need to know what grade to put in the grade book, and students need to know on the front end of any activity how they will be assessed. We suggest that effort and the actual process of completing the assignment be a strong component of whatever assessment is employed. So, if a letter grade is

required in your situation, be sure to let students know what constitutes an A, a B, and so forth.

Some of the best assessments are those designed by students and teachers collaboratively. By sharing the intended outcomes of the activity, you can engage students in the development of rubrics and even scoring guides. You may also ask students some important questions following the activity, such as: What did you learn about yourself as a writer by completing this activity? Such insights can help you develop future activities that meet student needs.

You also benefit your students greatly when you encourage them to write for a purpose other than receiving a grade or fulfilling a requirement, such as publication in magazines and on websites, recognition in district-wide collections of exemplary writing, or the creation of a school-wide literary journal. This helps students recognize the power of sharing their ideas and the many purposes writing can serve.

If we ever get to the point where the only activities we do in schools are those that are so concrete they can be reduced to a single letter or number grade, we have lost sight of the fact that some of school's—and life's—best learning moments cannot be distilled into a simplistic score. Some activities are inherently worthwhile and demand a narrative response from a teacher. Even a student who earns a “Super job!” comment needs to understand what specifically she or he did well, so it can be repeated in future writing.

These Activities Align with the Common Core State Standards

Education in the United States has changed significantly in the past decade, stemming from increased demands for accountability, higher standards, and supportive learning environments filled with rigorous and relevant learning

activities. In 2009 and 2010, a national initiative led by states emerged to identify what it is students should know and be able to do in English/language arts and mathematics. The resulting work yielded a set of comprehensive standards in English/language arts (ELA) and mathematics that do not tell teachers how to teach but rather that identify knowledge and skills essential in each of the two content areas. These Common Core State Standards rely on educators to determine how to best translate these standards into rigorous learning experiences that consider the needs of their students, the expectations of the communities in which they work, and the available resources to support students in their learning.

As the chart on page 5 shows, the activities in this book align with the Common Core State Standards for ELA. Using these activities in your curriculum will assist your students in strengthening their writing and communication skills. The activities will easily align with your district's adopted course of study, model curriculum, or your state's requirements. The activities are designed to extend students' thinking and deepen their skills in the essential process of communicating effectively.

The Common Core State Standards are based upon research that identifies skills essential to the writing process. Although the chart on page 5 identifies specific Common Core State Standards that align with each activity, the activities will most likely align with your state's standards as well, if your state has not adopted the Common Core State Standards.

Building an Appreciation for Writing

Something within the human condition implores us to communicate. We write, we talk, we sing, we read, we listen, we dance, we cheer, we karaoke (often badly), and we use every

Activities Aligned with Common Core State Standards

Common Core State Standard: Writing		Activity #
1	Write narratives to develop real or imagined experiences or events using effective techniques, relevant descriptive details, and well-structured event sequences.	9, 11, 12, 16, 17
2	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	1–9, 11–24
3	With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.	1–9, 11–24
4	Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in one sitting.	3–9, 11–24
5	Draw evidence from literary or informational texts to support analysis, reflection, and research.	9
6	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	3–9, 11–24
Common Core State Standard: Reading		Activity #
7	Determine a theme or central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.	11, 12, 17, 20–24
8	Determine the meaning of words or phrases as they are used in a text, including figurative and connotative meanings; analyzing the impact of specific word choice on meaning or tone.	11, 12, 20–24
9	Analyze how a particular sentence, chapter, scene, or stanza fits into the overall structure of a text and contributes to the development of the theme, plot, or setting.	23, 24
10	Explain how an author develops the point of view of the narrator or speaker in a text.	9
11	Compare and contrast the experience of reading a story, drama, or poem to listening to or viewing an audio, video, or live version of the text, including contrasting what they “see” and “hear” when reading the text to what they perceive when they listen or watch.	22
Common Core State Standard: Speaking and Listening		Activity #
12	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on topics, texts, and issues, applicable to specific grade level, building on others’ ideas and expressing their own clearly.	All
13	Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.	4, 12
Common Core State Standard: Language		Activity #
14	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.	All
15	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.	All
16	Use knowledge of language and its conventions when writing, speaking, reading, or listening.	All
17	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade-level requirements, choosing flexibly from a range of strategies.	3, 8, 16, 18–24
18	Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.	2, 3, 7, 8, 12, 15, 16, 18–24
19	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.	1–4, 7, 8, 11, 12, 16–24

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manner of verbal or physical expressions we can to get others to receive the stories we each contain. Voices memorialized on paper or sent into cyberspace seem to have a permanence not possible with the spoken word. Each essay, song lyric, reflection, or poem that we produce can last the eternity that we are not privileged to share. Decades—even centuries—from today, a new reader might pick up this or any other book and learn something about the long-ago world. Such is the power of the written word. That is why the art of writing is one of the most essential journeys we can share with our students and guide them to master.

A love for writing and a true understanding of the longevity of the written word takes time. To help develop this love and understanding, the activities in this book contain the following elements:

- **Personal expression.** The voices of our students are of utmost importance. Especially in early adolescence, there is both a need and a desire to talk about one's self and one's views of the world. Providing our students with a legitimate forum to express these ideas not only validates their opinions and insights, it also validates them as human beings. One of the greatest gifts we can give our students is to treat their words and their work with respect and dignity.
- **Open-endedness.** When we assign classroom activities, many students want to know the "right" way of completing them. The age-old request, "Just tell me what you're looking for," is the student's plea to grasp not only the purpose of our assignments, but also the preferred format, length, and style. We appreciate these students' desire to be both accurate and articulate, yet, simultaneously, we want them to express themselves in unique ways.

- **Integration.** Just as every person has a mind and a heart, the activities here provide opportunities for students to write from cognitive knowledge and emotional sensation. Not every student is equally skilled or enthusiastic when it comes to putting pen to paper or fingers to keyboard, and some students write freely about their inner selves while others are more reticent. This is why these activities allow for students to complete them with various levels of depth and knowledge.

- **Fun.** Not "enjoyment" or "pleasure" . . . *fun!* In this era of data-driven everything in our schools, the simple joy of playing around with ideas and words is increasingly left on the instructional sidelines. Lessons that are not measurable by some standardized something-or-other are given short-shrift by those overly concerned with accountability. However, we know this: Having fun while writing and sharing with others can result in some very special—and valuable—and educational—outcomes.

We always find great joy in students' work. So, please feel free to share some of your students' writing, or even your own experiences, by writing or emailing us in care of the address below. We'd love to hear from you.

Happy writing!

—Deb and Jim Delisle

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2. Who Knew?

Of all the activities we have done to get to know our students better, few have provided as much new and interesting information as this one. You may also know of similar activities under different names—“Liar’s Club,” for one—but “Who Knew?” is the one we use with our students. And yes, at various times throughout the year, when something new is learned about a classmate or the teacher, it is not unusual to hear a collective chorus of “Who knew?” arise from the classroom’s back rows of desks. So, in addition to being informative, this activity is also lots of fun.

Product	Students write five statements about themselves, one of which is false, and try to guess each other’s false statements
Materials	<ul style="list-style-type: none">• 1 copy of your own list of five “Who Knew?” responses for each student (four true facts and one lie about yourself)• 1 display copy of the “Who Knew?” student samples (page 17)• Access for all students to any age-appropriate resource for interesting facts, such as the iPhone application “Cool Facts” or a copy of <i>Who Knew? Things You Didn’t Know About Things You Know Well</i> by David Hoffman
Time	30 minutes
Common Core State Standards	Activity meets standards 2, 3, 12, 14, 15, 16, 18, and 19 from the chart on page 5.

Activity Steps

1. The Hook

Before class, research five facts and write them on the board or project them on the wall for your students to see as they enter the room. Make one of the facts false. Feel free to use the following example:

- Hostess produces 500 million Twinkies each year.
- The U.S. state with the longest coastline is Florida.
- Perfume was used a lot in 17th-century Europe because bathing was considered unhealthy and people usually bathed only once a year . . . or even less often.

- A human being’s largest organ is the skin.
- The White House in Washington, D.C., was originally gray.

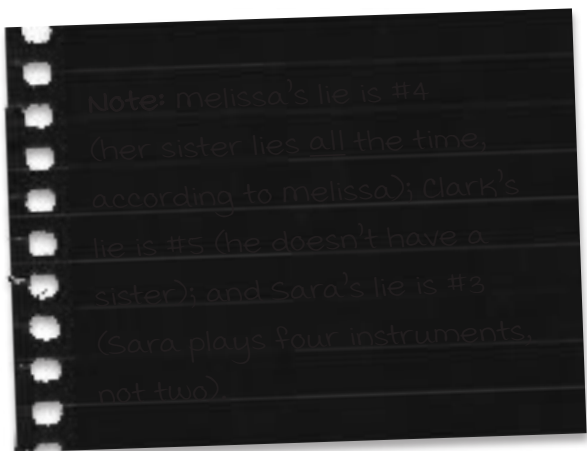
Tell your students that one of these five statements is not true, and ask them to guess which it is (in the example, it’s the second “fact”: Alaska is the U.S. state with the longest coastline). Next, ask students to volunteer any other interesting trivia they know about the world that others in class may not know. As students list off anomalies or little-known facts, toss in an occasional “Who knew?” to set the tone for what is to follow.

2. Introduce the Activity

Next, shift your class discussion to more personal factoids. For example, ask your students:

- From what nations are your parents, grandparents, or great-grandparents?
- How many different languages do you and your relatives speak?
- In how many different states and nations have you lived?
- What kinds of pets do you have in your home?

Inevitably, there may be a few surprises, an indication, perhaps, of the wide diversity you surely have in your class. To take it a step further, and to get students thinking even deeper about their diversity, show the “Who Knew?” student samples page and discuss them. This can be particularly helpful for those students who feel their lives are dull compared to others’. Students will note that some of the items listed by Sara, Clark, and Melissa are quite ordinary, giving your students permission to list some ideas that are not earth-shattering in any way.



Tell your students: “All of you have interesting tidbits about your experiences and goals that might be surprising for others in class to learn. Even I have some intriguing parts of my past that might surprise you.” Then, share the

“Who Knew?” handout you created about your own life and ask students to guess which of the five statements on your sheet is false. Finally, tell students it is now their turn to surprise each other.

Here is a “Who Knew?” list Jim has shared with his students.

Jim's “Who Knew?” List

1. I had to take over the controls of a small plane when the pilot got sick.
2. I almost drowned when I fell off a boat into the ocean.
3. I like listening to music by Pearl Jam, Etta James, Louis Armstrong, and Green Day.
4. I bought a sports car but didn't know how to use its stick shift and clutch to change gears.
5. I took my first overseas trip by throwing a dart at a world map and traveling where it landed.

(The lie is #1)

3. Invite Students to Complete Their Own Responses

Ask your students to write four truths and one lie on the back of the handout with your list. Allow five minutes to complete this, then proceed one of two ways: have each student read his or her individual statements; or, if the class is large, have students converse in small groups, reporting back only those students who managed to surprise everyone enough that the group said a collective “Who knew?”

Extensions

Classroom Extensions

1. Once the students have read their lists, take a digital photograph of each student and display the students' headshot photographs next to their "Who Knew?" lists. Attach each list to the wall, adjacent to the student's photo, but do not tape the bottom of the list to the wall. Instead, ask students to identify their lies on the backside of the page so others can lift the paper to find out what's true . . . and what isn't. If you have a class website or blog, you can post students' lists and photos there, revealing the lies in a subsequent post. Encourage friends and families to post comments—and guesses—in the comment section.

2. As a team or grade-level activity, assemble your students into the auditorium and have each of their teachers go onstage with their "Who Knew?" lists projected behind them or next to them. Have students indicate which item they believe is a lie for each teacher by applauding when the item is read aloud. When each lie is revealed, have the assembled students shout "Who Knew?" before proceeding to the next teacher. It helps to have an emcee for this—perhaps the school principal—whose "Who Knew?" list can be revealed at the activity's conclusion.

3. Do this activity near the beginning of the year, make copies of each student's list, and put them aside until the school year's end. Then do the activity again without letting students see what they wrote at the beginning of the year. Afterward, have each student compare the early and current lists to see if any more interesting changes or challenges have occurred over a year's time.

4. As new students join your classroom, partner them up with one or two other students and ask these students to explain the "Who Knew?" activity and share their own lists. Then, after the new student has completed his or her list, have the "veteran" students introduce this new classmate to everyone using the "Who Knew?" list.

School Extension

If your school district provides a mentoring program in which new teachers are paired with experienced teachers for a year or more, use the "Who Knew?" activity as an icebreaker during one of the early mentoring meetings. Then, at a time closer to the end of the year, have the new teachers complete another "Who Knew?" list, but this time, each of the items listed must represent something they experienced during that year of teaching. For example, "I called a parent to talk about a behavior problem with their child and realized I'd phoned the wrong parent." Again, one of these statements will be a lie . . . but it may be hard to determine which one it is.

Family Extension

Give the "Who Knew?" activity as "family homework," asking each adult and sibling in the family to complete a "Who Knew?" list. This could also include grandparents and other relatives willing to participate. After the lists are compiled, have each student collect these lists and interview one of the family members whose list was most intriguing to them. The student can then write a brief essay, "The relative I thought I knew."



Sixth Graders' "Who Knew?" Lists

melissa

1. I almost got lost at the Grand Canyon.
2. I hit my head on four metal bars while falling off a jungle gym.
3. I've been to Canada.
4. I have a sister named Stacy who doesn't lie.
5. I know someone who guards the Dalai Lama.

Clark

1. I pulled a fire alarm when I thought it said "free."
2. I cried when my fish got flushed down the toilet.
3. I'm afraid of my grandmother.
4. I can't bend my big toe backward.
5. I named my sister "Rudolph" when she was born.

Name: Sara

1. I'm one of the few girls in my class who has never had a boyfriend.
2. I got my head stuck in a folding chair.
3. I can play two instruments.
4. I'm considering being a teacher for my career.
5. I didn't have hair until I was $3\frac{1}{2}$ years old and then it grew in all white.

18. Fib's Follies

This lesson began when a teacher shared with us a poem one of her high school students had written for a class assignment. What was unusual, though, was that the poetry-sharing teacher was teaching precalculus! Who knew that math and poetry had anything in common? Here is an excerpt from that teacher's letter:

"When I was teaching sequences, I did some research on the Internet and came across some Fibonacci poetry, so I gave the assignment of writing a Fibonacci poem for extra credit. I was overwhelmed by what my tenth graders turned in to me."

For those of you who are math savvy, the Fibonacci sequence is generated by this rule:

$$F_n = F_{n-1} + F_{n-2}$$

For the math phobic, or for those who have only a fuzzy recollection of anything beyond long division, the Fibonacci sequence is a pattern that has been called "nature's numbering system." You encounter the Fibonacci sequence every day, as it appears naturally in the petals of flowers, the spirals of pinecones, and the scales on pineapples.

Product	A collection of poems written in a specific way that mimics the mathematical phenomenon of the Fibonacci sequence
Materials	<ul style="list-style-type: none">• 1 display copy of the "I Hope You See . . ." poem (page 124)• 1 copy of "Fibonacci Poetry" handout (page 125) for each student• 1 display copy of "The Mystery of the Fib." (page 126)• Optional: 1 pineapple, some marigolds, a pinecone, black-eyed Susans, or sunflowers (photos of these items will also work: do an Internet image search for "Fibonacci sequence in nature")
Time	One 45-minute class period to explain the lesson and begin some writing, with homework to complete the assignment (or additional class time if preferred)
Common Core State Standards	Activity meets standards 2, 3, 4, 6, 12, and 14–19 from the chart on page 5.



Activity Steps

1. The Hook

Ask your students to ponder the following idealized situation: “Suppose a newly born pair of rabbits, one male and one female, is put in a field. Rabbits are able to mate at the age of one month [pause here for student gasps!], and once conceived, new rabbits are born in one month. At the end of the second month, a female can produce another pair of rabbits. Suppose that these rabbits **never die** and that the female **always** produces one new pair (male and female) from the second month on. How many pairs of rabbits will there be in a year?”

Of course, your students may remind you that you have forgotten the fact that you teach language arts, not math. Remind them (smugly, of course) that you will get there soon enough.

The answer to the above rabbit population boom is as follows, which you can illustrate if none of your students has beaten you to it.

1. At the end of the first month, the rabbits mate, but there is still only one pair.
2. At the end of the second month, the female produces a new pair, so there are now two pairs of rabbits in the field.
3. At the end of the third month, the original female produces a second pair, making three pairs in the field.
4. At the end of the fourth month, the original female has produced yet another new pair, while the female born two months ago produces her first pair, making five pairs of rabbits.
5. The sequence continues as such. The number of pairs of rabbits in the field at the start of each month is as follows: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144. So, by December’s end, the field will be hopping with 144 pairs of bunnies.

Astute students will realize the simplicity of the above sequence: the way to get to the new number is to add the two preceding numbers. Thus, $1 + 1 = 2$, $2 + 1 = 3$, $3 + 2 = 5$ and so on, until $55 + 89 = 144$. The sequence is endless.

End this introduction by displaying the “I Hope You See . . .” poem, which is written using the Fibonacci sequence with respect to each line’s syllable count.

2. Introduce the Activity

Now that you have totally inspired and impressed your students with your blending of mathematics and writing, it’s time to turn them on to another subject: science. If you brought in the optional fruit and flowers to show as examples, take these out for display and close inspection. If not, show photos you’ve found online that show the Fibonacci sequence.

Time after time the Fibonacci sequence appears in nature. For example, a sunflower spirals out from its center in both a clockwise and a counterclockwise direction, and the number of spirals is always two consecutive numbers in the Fibonacci sequence. The same is true in pine cones, where the spirals start at the cone’s base and go round and round the side until reaching the cone’s top—all in numbers that fall into the Fibonacci sequence. The same patterns are found in the shells of snails and in countless other instances in nature. After explaining and showing your students these patterns, allow them to examine your examples.

Let your students know that they are going to write poetry in which the syllables adhere to the Fibonacci sequence. Specifically, the first two lines of their poem will consist of one syllable each, the third line will contain two syllables, the fourth line three syllables . . . and on and on, just as in the example that you read to them to introduce this activity.

If you're so inclined, after dazzling your students with your knowledge of writing, mathematics, *and* science, you can offer them another lesson . . . in history:

Leonardo Fibonacci of Pisa lived from 1170–1250 and is considered by many to be the greatest mathematician of the Middle Ages. Even though the sequence is named after him, Fibonacci did not discover the above sequence, which had, indeed, been noticed by Indian mathematicians as early as the sixth century. However, in a book that Fibonacci wrote in the thirteenth century, he introduced Europeans to the Hindu-Arabic numeral system (which uses the numerals 0–9 and place values), focusing on how this system could be useful for bookkeeping, weights and measures, calculating interest, and other mathematical operations we perform every day. He also mentioned in an “oh, by the way” manner that a curious sequence of numbers appeared in nature frequently. Ever since then, this sequence has been associated with the mathematician who introduced the concept to the Western world.

3. Invite Students to Complete Their Own Responses

Distribute the “Fibonacci Poetry” handout to your students and go over it together. Focus your students’ attention on the bottom of the page, where the assignment specifications are detailed. The topics listed are meant as starting points only; invite your students to come up with additional ideas for prompts. You may require as many Fib sequence poems as you wish.

To help your students get a stronger grasp on the assignment, distribute “The Mystery of the Fib.,” written by Nadine, an eighth grader in Texas. As her teacher explained to us, “Nadine’s poem overwhelmed me in so many ways—four stanzas; the sequence reversing; but mostly it was the content. *Wow!*”

We certainly agree! Suggest to your students that they, too, could use an increasing and decreasing line length (reversing the sequence).

There should be some time during this class session for your students to select a topic for their poems and begin writing the initial lines or stanzas. Ask students to complete their poems at home that night and bring in their creations the next day, when you can have them read each other’s work and offer each other ideas and tips for revision. Post the finished results in or outside of your classroom or on a class website or blog, preferably attached to a photo that was taken or downloaded of an aspect of nature that follows the Fibonacci sequence.

Extensions

Classroom Extensions

1. If students need to complete book reports or character studies, have them write these assignments using a Fib sequence structure.
2. If students who are more mathematically or scientifically inclined would like to pursue further research on the Fibonacci sequence, ask them to explore “The Mystery of the Golden Ratio” (readily accessible on many websites, especially as it relates to the human body). Among other things, your students will discover that the following ratios are all identical:

- between the length and width of one’s face
- between the length of one’s mouth to the width of one’s nose
- the distance between the shoulder line and the top of the head

All these ratios are 1: 1.618—the exact ratio that makes the basis for the Fibonacci sequence.

School Extension

Many schools celebrate “Pi Day” in mid-March, to celebrate the magic and mystery of the number pi. Why not *also* have a “Fib Day,” during which students recite their Fib sequence poetry, display artwork and photography they have created using the Fib sequence, create and play board games where moves can only be made sequentially according to the Fib sequence, and search the school grounds for examples of the Fib sequence in nature? As icing on the cake, ask one of the math teachers to dress up as Leonardo Fibonacci and detail some of his other mathematical ideas and discoveries. End the day with a game show, “The biggest Fib-ber,” in which students tell one truth and one lie about anything mathematical, while the audience tries to figure out which is which.

Family Extension

Students and their parents can search for the Fib sequence in a variety of forms, including the following:

- In art: Leonardo da Vinci used the Fib sequence in some of his paintings, including *The Annunciation*.
- In movies: *The Da Vinci Code* uses the Fib sequence as a safe’s combination.
- In music: Artists as diverse as Tool in “Lateralus” and Claude Debussy in “Reflections in Water” use the Fib sequence in their songs’ rhythms.
- In architecture: The Parthenon in Athens and the United Nations Building in New York City both use the Fib sequence in some aspects of their design.
- In nature: Nothing like a good walk outside to reveal nature’s many examples of the Fib sequence.

Further, an online search for “Fibonacci games” will provide many examples of easy-to-difficult puzzles that use the Fib sequence for reaching a solution.





I
Hope
You see
The beauty
And timeless wonder
Of the Fibonacci sequence

Because this is going to be your next assignment

Fibonacci Poetry

The Fibonacci sequence is nature's numbering system. Time and time again, a plant's leaves or an animal's scales are arranged in this sequence. So, the number of bracts on a pinecone or the arrangement of scales on a pineapple are similar from one pineapple or pinecone to the next. The Fibonacci sequence was discovered centuries ago and, as you'll soon learn, it applies to many objects in nature.

In the Fibonacci sequence, each number is the sum of the two preceding numbers, like this: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 377, 610, 987, 1597, 2584, 4181 . . . (each succeeding number is the sum of the previous two).

Just as the Fibonacci sequence creates beauty in nature, so can it create beauty in art. Your assignment is to use this rhythmic pattern in the lines of a poem.

Take a look at the following examples. The first line of each poem is just one syllable, as is the second line. Each poem's third line is two syllables, and each poem's fourth line is three syllables. The number of syllables in each line corresponds to the numbers in the Fibonacci sequence.

*One
Small
Precise
Poetic
Spiraling mixture
Math plus poetry yields the Fib*

*Math
makes
my head
quake with pain.
Writing a poem based
on Fibonacci does the same*

*This
Is
Far more
Geeky than
Another haiku
Can't we just forget the whole thing?*

*This
is
going
to be a
terrible poem
unless I nail a great finish*

Here are some ideas for topics, but you may also come up with your own:

- I learned this about myself as a student . . .
- I cope with stress by . . .
- When I want to change things in my life, I will . . .
- I have discovered that I need . . .
- I have discovered that I love . . .
- I'd like my teachers (or parents or friends, etc.) to know . . .
- When I think of a memory I want to keep forever . . .
- My life's biggest goals involve . . .
- What is better than . . .

Your poem does not have to rhyme (none of the examples do), and it's up to you to make it either profound and insightful or playful and humorous—a lot of that depends on which of the above prompts you select.

*Now.
Get
To work.
You have no
Time to sit and sit
While other students are writing!*

The Mystery of the Fib.

by Nadine, 8th grade

I
love
it when
I'm able
to bring together
my artistry and nerdiness
universally
united
nature
and
math

Will
we
ever
discover
if Fibonacci
uncovered the numbers that could
provide the bridge for
the worlds of
nature
and
math?

And
yet
is this
but one great
coincidence that
Fib's sequence can be found in things
from flowers to bees
that do not
comply
to
math?

Or
do
answers
to questions
of such magnitude
remain as mysteries to us.
the idea that
nature could
answer
to
math?



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