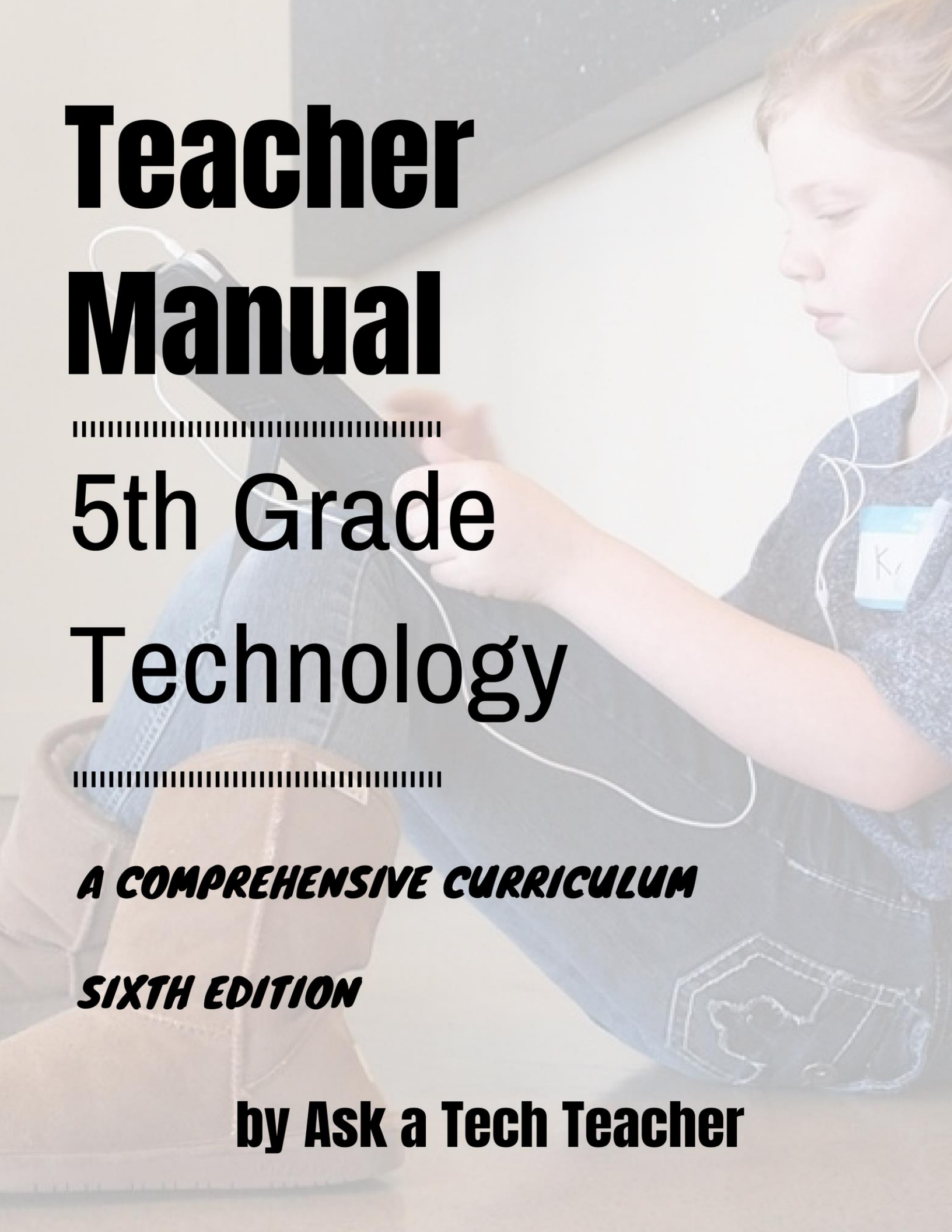

Teacher Manual

5th Grade Technology

A COMPREHENSIVE CURRICULUM

SIXTH EDITION

by Ask a Tech Teacher

FIFTH GRADE TECHNOLOGY

A COMPREHENSIVE CURRICULUM

Part Six of Nine of the SL Technology Curriculum

Version 6.4 2020

Visit the companion website at Ask a Tech Teacher for more resources to teach technology

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Introduction

The educational paradigm has changed—again. Technology is now granular to learning, blended into standards from Kindergarten on, like these standards rephrased from Common Core:

- *Expect students to demonstrate sufficient command of **keyboarding** to type a minimum of one page [three by sixth grade] in a single sitting*
- *Expect students to **evaluate different media** [print or digital]*
- *Expect students to **gather relevant information** from print and digital sources*
- *Expect students to integrate and evaluate **information presented in diverse media** and formats*
- *Expect students to **interpret information** presented visually, orally, or quantitatively [such as interactive Web pages]*
- *Expect students to make **strategic use of digital media***
- *Expect students to use **glossaries or dictionaries, both print and digital** …*
- *Expect students to use information from **illustrations and words in print or digital** text*
- *Expect students to communicate with a **variety of media***
- *Expect students to **use text features and search tools** (e.g., key words, sidebars, **hyperlinks**) to locate information*

But how is this taught?

With the **Structured Learning Technology Curriculum**. Aligned with Common Core State Standards* and National Educational Technology Standards, and using a time-proven method honed in classrooms, students learn the technology that promotes literacy, critical thinking, problem-solving, and decision-making through project-based work. The purpose is not to teach step-by-step tech skills (like adding borders, formatting a document, and creating a blog). There are many fine books for that. What this curriculum does is guide you in providing the ***right information at the right time***.

Just as most children don't read at two or write at four, they shouldn't be required to place hands on home row in kindergarten or use the Internet before they understand the risks and responsibilities. The Structured Learning curriculum makes sure students get what they need at the right age with proper scaffolding. The end result is a phenomenal amount of learning in a short period of time.

"New technologies have broadened and expanded the role that speaking and listening play in acquiring and sharing knowledge and have tightened their link to other forms of communication. Digital texts confront students with the potential for continually updated content and dynamically changing combinations of words, graphics, images, hyperlinks, and embedded video and audio."

—CCSS

"Use of technology differentiates for student learning styles by providing an alternative method of achieving conceptual understanding, procedural skill and fluency, and applying this knowledge to authentic circumstances."

—CCSS

If there are skills you don't know, visit our Help blog, Ask a Tech Teacher.com or visit the online companion resources at Structured Learning.net. It includes free videos to unpack each lesson, how-to's for curriculum skills, and more.

What's in the SL Technology Curriculum?

The SL Curriculum is project-based and collaborative, with wide-ranging opportunities for students to show their knowledge in the manner that fits their communication and learning style. Each grade level in the curriculum includes five topics that should be woven into 'most' 21st-century lesson plans:

- *keyboarding—more than typing*
- *digital citizenship—critical with Internet-based learning*
- *problem-solving—encourage critical thinking*
- *vocabulary—decode unknown words with technology*
- *publishing-sharing—to promote collaborative learning*

Here's a quick overview of what is included in the curriculum:

- *curated list of assessments and images*
- *articles that address tech pedagogy*
- *Certificate of Completion for students*
- *curriculum map of skills taught*
- *monthly homework (3rd-8th only)*
- *posters to visually represent topics*
- *Scope and Sequence of skills taught*
- *full lesson on keyboarding, digital citizenship and problem solving (at most grade levels)*
- *step-by-step weekly lessons*

Each weekly lesson includes:

- *assessment strategies*
- *class warm-up and exit ticket*
- *Common Core Standards*
- *differentiation strategies*
- *educational applications*
- *essential question and big idea*
- *examples, rubrics, images, printables*
- *ISTE Standards*
- *materials required*
- *pedagogic articles (if any)*
- *problem solving for lesson*
- *skills—new and scaffolded*
- *steps to accomplish goals*
- *suggestions to unpack*
- *suggestions based on digital device*
- *teacher preparation required*
- *time required to complete*
- *vocabulary used*
- *weekly how-to video (online)*
- *weekly real-time online question sessions*

Programs Used

Programs used in this curriculum focus on skills that serve the fullness of a student's educational career. Free alternatives are noted where available:

General		2-8	
Webtools	*Drawing program*	*Word processing tools*	*Desktop publisher*
Google Earth	*Image editor*	*Spreadsheet tools*	*Presentation tools*
	Keyboarding tool	*Email program*	

What's in the Sixth Edition?

In response to your requests, here are changes you'll find in the Sixth Edition:

- *You'll learn how to unpack lessons whether you're the **grade-level teacher or the tech teacher**.*
- *Lessons can be delivered on all **popular digital devices**.*
- *The importance of **higher order thinking**— analysis, evaluation, and synthesis—is called out.*
- *The importance of '**habits of mind**' is included.*
- *Lessons note which **skills are scaffolded** from earlier lessons and which are new.*
- *Each lesson points out **academic applications** of technology.*
- *Students learn to **understand the process**, not just replicate a skill.*
- ***Collaboration and sharing** is often required.*
- *Teachers learn strategies to **meet students where they learn**.*
- *Each lesson includes a **warm-up and exit ticket**.*
- *A **Table of Images** and a **Table of Assessments** are included.*
- ***Scope and Sequence** includes CCSS references.*
- ***Curriculum Maps** shows which month topics are covered as well as which grade.*
- *Each grade-level curriculum includes **student workbooks** (sold separately).*
- *Each grade level has a **lesson on coding**.*

Who Needs This Book

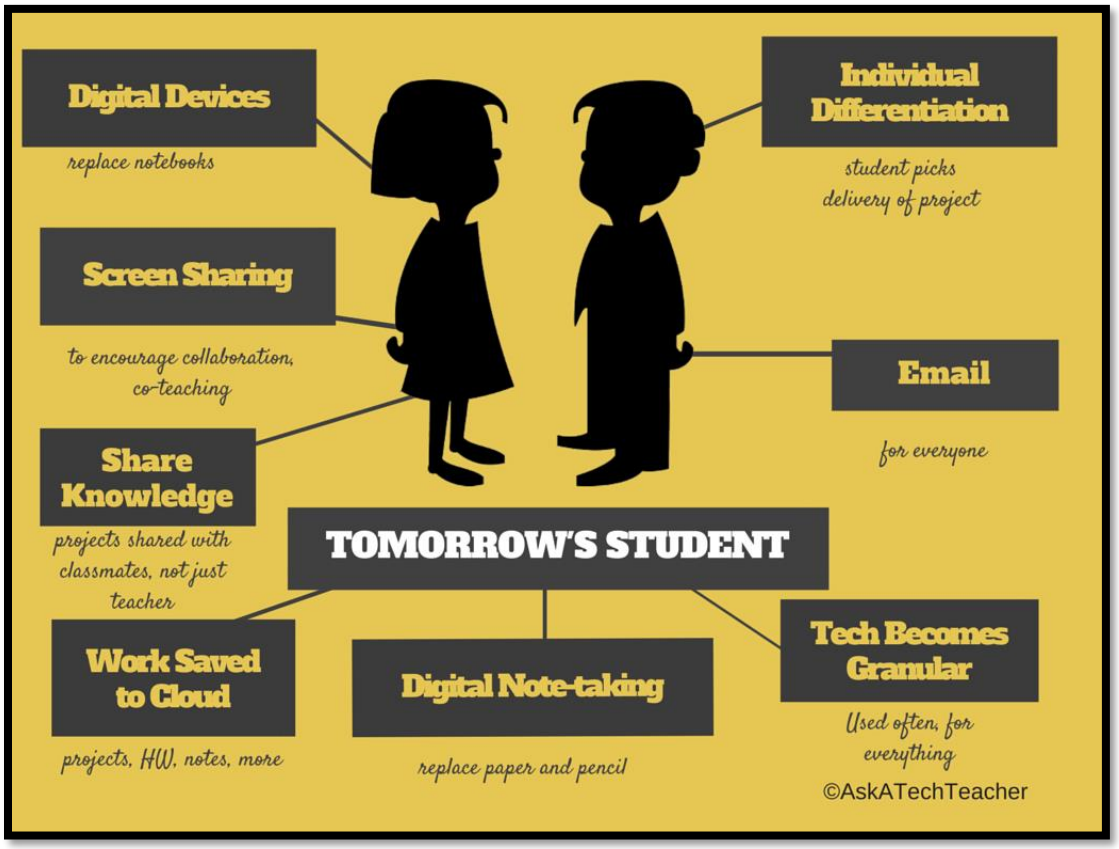
You are the Tech Specialist, Coordinator for Instructional Technology, IT Coordinator, Technology Facilitator or Director, Curriculum Specialist, or tech teacher—tasked with finding the right project for a classroom. You have a limited budget, less software, and the drive to do it right no matter roadblocks.

Or you are the classroom teacher, a tech enthusiast with a goal this year—and this time you mean it—to integrate the wonders of technology into lessons. You've seen it work. Others in your PLN are doing it. And significantly, you want to comply with Common Core State Standards, ISTE, your state

requirements, and/or IB guidelines that weave technology into the fabric of inquiry.

You are a homeschooler. Even though you're not comfortable with technology, you know your children must be. You are committed to providing the tools s/he needs to succeed. Just as important: Your child WANTS to learn with these tools!

Figure 1—Tomorrow's student



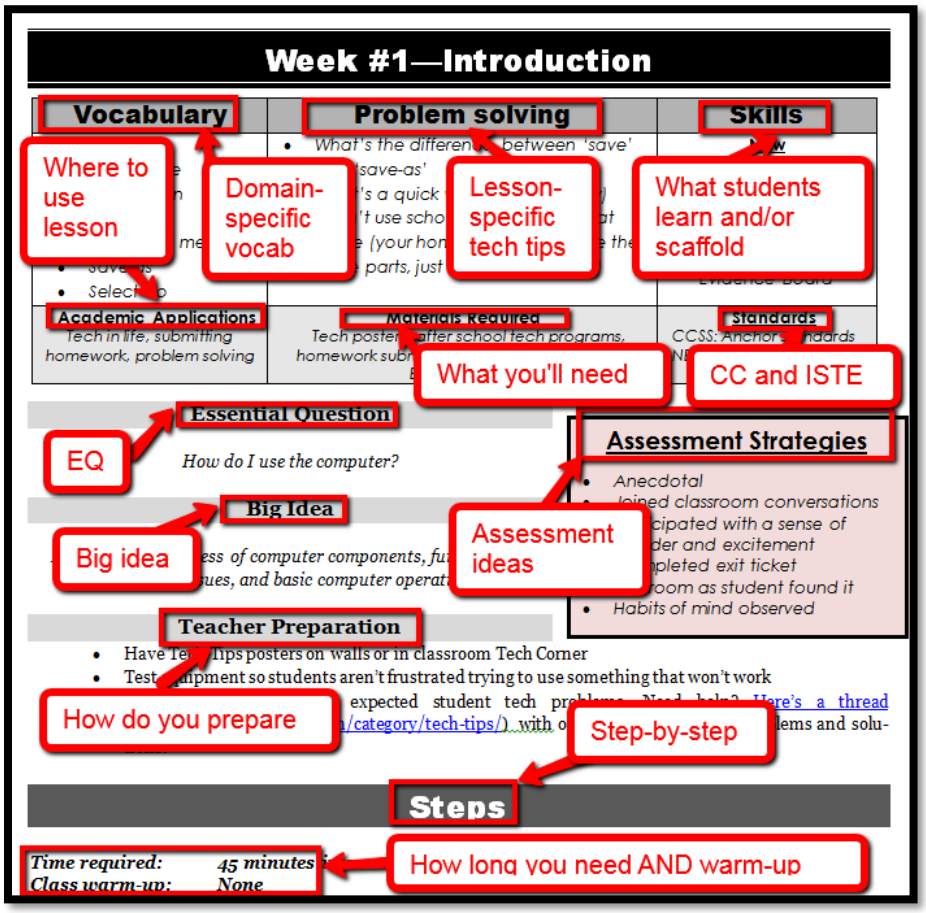
How do you reach your goal? With this curriculum. Teaching children to strategically and safely use technology is a vital part of being a functional member of society—and should be part of every school's curriculum. If not you (the teacher), who will do this? To build **Tomorrow's Student** (*Figure 1)* requires integration of technology and learning. We show you how.

How to Use This Book

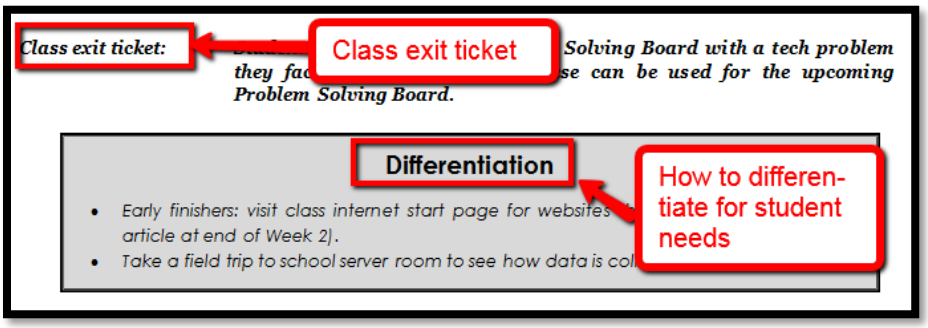
Figure 2a shows what's at the beginning of each lesson. *Figure 2b* shows what you'll find at the end:

- *Academic Applications*
- *Assessment Strategies*
- *Big Idea*
- *Class Warm-up*
- *Essential Question*
- *Material Required*
- *Problem solving*
- *Skills*
- *Standards*
- *Steps*
- *Teacher Prep*
- *Time Required*
- *Vocabulary*

Figure 2a-b—What's in each lesson?



- *Class differentiation strategies*
- *Class exit ticket*



The curriculum map in *Figure 3* shows what's covered in which grade. Where units are taught multiple years, teaching reflects increasingly less scaffolding and more student direction. If you're the grade-level teacher, here's how to use the map:

- Determine what skills were covered earlier years. Expect students to transfer that knowledge to this new school year.

- Review the topics and skills, but don't expect to teach.
- If there are skills listed as covered prior years, confirm that was done. If they weren't (for whatever reason), when you reach lessons that require the skills, plan extra time.

Figure 3—Curriculum Map—K-8

	Mouse Skills	Vocabulary - Hardware	Problem-solving	Platform	Keyboard	WP	Slide-shows	DTP	Spread-sheet	Google Earth	Search/ Research	Graphics/	Co-ding	WWW	Games	Dig Cit
K	☺	☺	☺	☺	☺					☺		☺	☺	☺		☺
1	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺		☺	☺	☺		☺
2		☺	☺	☺	☺	☺	☺	☺	☺	☺		☺	☺	☺		☺
3		☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺		☺
4		☺	☺		☺	☺	☺	☺	☺	☺	☺	☺	☺	☺		☺
5		☺	☺		☺	☺		☺	☺	☺	☺	☺	☺	☺		☺
6		☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺		☺
7		☺	☺	☺	☺	☺			☺	☺	☺	☺	☺	☺	☺	☺
8		☺	☺	☺	☺	☺			☺	☺	☺	☺	☺	☺	☺	☺

Figure 4 is a month-by-month curriculum map for this grade level. In the student workbook, students complete this themselves or as a group when they finish each lesson.

Figure 4—Curriculum Map—5th grade, month-to-month

	Sept *Wk1-4*	**Oct** *Wk5-8*	**Nov** *Wk9-12*	**Dec** *Wk13-16*	**Jan** *Wk17-20*	**Feb** *Wk21-24*	**March** *Wk25-28*	**Apr** *Wk29-32*
Blogs	x			x		x		
Class mgmt tools	x							
Coding		x						x
Collaboration						x	x	x
Communication	x							x
Computer etiquette	x							x
Critical thinking	x			x	x			x
DTP			x	x				x
Digital Citizenship	x							x
Google Earth						x		x
Graphics						x	x	x
Internet			x			x		x

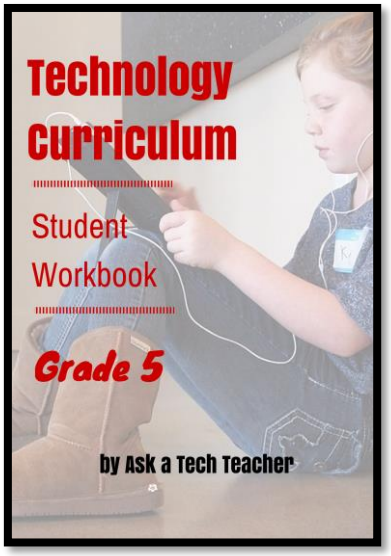
Internet privacy	x					x		x
Keyboarding	x	x				x		x
Presentations								x
Problem solving	x	x	x	x	x	x	x	x
Publishing/sharing	x							x
Research			x					x
Spreadsheets					x			x
Visual learning		x	x	x	x			x
Vocabulary	x	x	x	x	x	x	x	x
Webtools	x	x				x		x
Word Processing	x	x				x		x

Some topics are covered every month. The strategy: spiral and scaffold learning until it's habit.

If there is a skill students don't get, circle back on it, especially when you see it come up a second or third time through the course of the K-8 curricula. By the end of 8th grade, students have a well-rounded tech toolkit that serves their learning needs and prepares them for college and/or career.

Here are hints on using this curriculum:

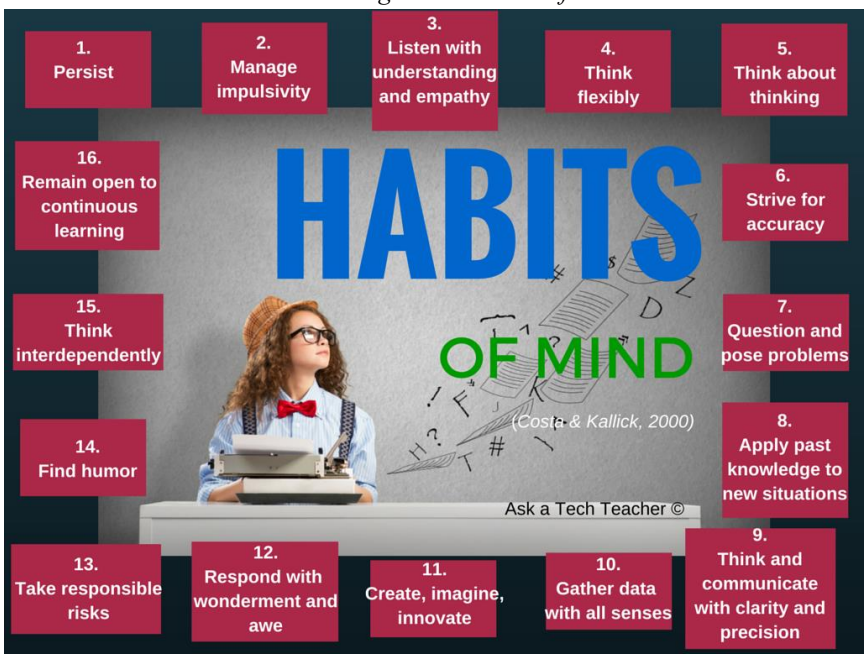
Figure 1--Student workbooks



- Get free curriculum-aligned resources at Ask A Tech Teacher or email askatechteacher at Gmail dot com with questions.
- Invest in student digital workbooks (sold separately), a student-centric companion to the teacher guide. Why?
    - *Projects are at student fingertips with full-color examples and directions (licensing varies depending on plan).*
    - *Workbooks can be viewed and annotated through a reader.*
    - *Students work at their own pace.*
- Once you've selected the program best for you, contact Zeke Rowe at structuredlearning.net for free start-up training.
- Teach lessons in the order presented in the book (grades K-5). They introduce, reinforce, and circle back on skills and concepts. Resist the urge to mix up lessons even if your perfect time for a particular project comes earlier/later than placement in the book. Some lessons can be taught any time during the year (like coding) or throughout the year (like keyboarding, digital citizenship, and problem solving).
- Don't expect to get through all lessons the first time you teach the curriculum. Lessons rely on scaffolded knowledge from prior years. Until students have built that foundation, they will move more slowly through activities. As students learn skills, expect more out of them.
- Personalize the skills taught in each lesson to your needs with 'Academic Applications'. These are suggestions for blending learning into your school curriculum.

- Most lessons start with a warm-up to get students back into tech and give you time to finish up a previous class. This is especially useful to the tech teacher and the LMS. Most lessons end with an Exit Ticket to wrap up learning.
- Some lessons offer several activities that will meet goals outlined in the Essential Question and Big Idea. Pick the activity (or activities) that work well for your student group. Alternatively, you can let students pick the one they like best.
- 'Teacher Preparation' often includes chatting with the grade-level team. Why?
    - *tie tech into their inquiry*
    - *offer websites for early-finishers that address their topics*
- Check off completed items on the line preceding the activity so you know what to get back to when you have time. If you have the ebook, use iAnnotate, Notable (Google for websites), or another annotation tool that works for your devices.
- The curriculum expects students to develop 'habits of mind'. Read more about Art Costa and Bena Kallick's discussion of these principles in *Figure* 6, and the article at the end of Lesson #1. In a sentence: Habits of Mind ask students to engage in their learning, not simply memorize.

Figure 6—Habits of Mind



- Sometimes the class is too excited about what they're learning to move on. Take an extra week. Most schools run 35-40 weeks. This book includes 32 lessons.
- Expect students to be risk takers. Don't rush to solve their problems. Ask them to think how it was done in the past. Focus on problems listed in the lesson, but embrace all that come your way. This scaffolds critical thinking and troubleshooting when you won't be there to help.
- Expect students to direct their own learning. You are a 'guide on the side', a facilitator not lecturer. Learning is accomplished by both success and failure. Don't expect free time while students work. Move among them to provide assistance, and observations on their keyboarding, problem-solving, and vocabulary decoding skills.

- Encourage student-directed differentiation. If the Big Idea and Essential Question can be accommodated in other ways, embrace those.
- If you need resources on specific topics, check Ask a Tech Teacher's resource pages.
- Always use lesson vocabulary. Students gain authentic understanding by your example.
- Look for these icons:


indicates video


indicates work with a partner

indicates an article

indicates a poster (in Appendix)


indicates material in workbooks

- Use as much technology as possible in your classroom—authentically and agilely--whether it's a smartphone timing a quiz, a video of activities posted to the class website, or an audio file with student input. If you treat tech as a tool in daily activities, so will students.
- **If you have the digital book, zoom in on posters, rubrics, lessons to enlarge as needed.**
- Every effort has been made to accommodate digital devices. If the activity is impossible in a particular digital device (i.e., iPads don't have mouses; software doesn't run in Chromebooks), focus on the **Big Idea and Essential Question**—the skill taught and its application to inquiry. Adapt instructions to the tool you use as you work through the steps.

Figure 7—Compatible digital devices

A desktop PC, iMac, laptop, MacBook, Chromebook, iPad, or smartphone

- Throughout the year, circle back on concepts. It takes five times to get a skill (*Figure 8*)—
  - ***First***: *They barely hear you*
  - ***Second***: *They try it*
  - ***Third***: *They remember it*
  - ***Fourth***: *They use it outside of class*
  - ***Fifth***: *They tell a friend*

Typical Lesson

Each lesson requires about 45 minutes a week, either in one sitting or spread throughout the week, and can be unpacked:

- *In the grade-level classroom*
- *In the school's tech lab*

Figure 2--It takes 5 times...

In general terms, here's how to run a lesson in **the tech lab**:

- Post a **written schedule** for the day on the class screen:
    - *Warm up*
    - *Main activity*
    - *Exit ticket*

  This gives students a visual guideline. Add it to your class blog or website to serve those students who aren't present. Expect students to start with the warm-up when they arrive to class.
- **Warm up about 10 minutes,** often with typing practice.
- Complete student **Board presentations** (grades 3-8).
- If it's the end of a grading period, review skills accomplished with **Scope and Sequence**.
- If starting a **new project, review it**. If in the middle of one, use the balance of class to work towards completion. Monitor, answer questions, and help as needed.
- As often as possible, give **younger students two weeks** to finish a project—one to practice, one to save/export/share/print. This redundancy reinforces new skills and mitigates stress. If it's week two, start with the project and finish with typing so students have ample time to work.
- List age-appropriate websites on class Internet start page that **tie into inquiry** for students who complete the current project. Students know these websites can be used during free time.
- **Class exit ticket** might include lining up in arrays, answering a poll posted on the class screen, or simply have classmates verify that neighbors left their stations as they found it.
- **Use tech wherever possible.** Model what you ask of them.

Here's how to run the lesson in **the grade-level classroom**:

- Take the lesson pieces mentioned above and scatter them throughout the week. For example:
    - ***3-10 minutes for the class warm-up—****at the start of the week*
    - ***10-15 minutes keyboarding practice—****any day*
    - ***10-15 minutes Board presentations—****any day*
    - ***15-35 minutes for the project—****any day*
    - ***2-3 minutes for class exit ticket****—to reinforce learning*

- **Check off accomplished activities** so you know what remains each week.

Here are useful pieces to extend this curriculum, available from Structured Learning:

- *Student workbooks—allow students to be self-paced*
- *Digital Citizenship curriculum— if this is a school focus (sold separately)*
- *Keyboarding Curriculum— if this is a school focus (sold separately)*

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About the Authors

Ask a Tech Teacher *is a group of technology teachers who run an award-winning resource blog. Here they provide free materials, advice, lesson plans, pedagogical conversation, website reviews, and more to all who drop by. The free newsletters and articles help thousands of teachers, homeschoolers, and those serious about finding the best way to maneuver the minefields of technology in education.*

Table of Contents

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Lesson #4 Student Blogs

Vocabulary	Problem solving	Skills
• *Avatars* • *Blog* • *Comments* • *Home row* • *Keyboard shortcut* • *Mulligan Rule* • *Netiquette* • *Post* • *Shortkeys* • *Web log*	• *I don't see my blog post (teacher must approve it)* • *Why can't I use my picture in blog? (discuss digital privacy)* • *Someone made a mean comment (teacher is moderating; it won't show)* • *Can't figure it out (breathe deeply, check screen, you can do it)* • *Log-in didn't work (verify UN and PW before asking teacher for help)*	**New** *Blogging* **Scaffolded** *Speaking and listening* *Problem solving* *Keyboarding* *Digital citizenship*
Academic Applications *Writing, research, collaboration, sharing, publishing, use of evidence, online safety*	**Materials Required** *hardware quiz, keyboard program, blog log-ins, blog posts for student response, Problem Solving Board sign-ups, Evidence Board badges, student workbooks (if using)*	**Standards** *CCSS: W.5.1* *NETS: 2b, 3c-d, 6d, 7a-b*

Essential Question

How do I share with classmates?

Big Idea

Students become aware of how tech enhances educational

Teacher Preparation

- Have Problem-solving Board sign-up sheets.
- Have copies of Blogging Agreement (if necessary).
- Collect words students don't understand for Speak Like a Geek Board presentations.
- Know which tasks weren't completed last week and whether they are necessary to move forward.
- Set up accounts in a blogging program.
- Remind students to bring science book next week.
- Talk with grade-level team so you tie into conversations.
- Ask about tech problems students are having difficulty with. Cover them during tech lessons.
- Ensure that all required links are on student computers.
- Be prepared to integrate domain-specific tech vocabulary into lesson.
- Know whether you need extra time to complete this lesson with your student group.

Assessment Strategies

- *Completed hardware quiz*
- *Annotated workbook (if using)*
- *Signed up for Board*
- *Completed blog assignments*
- *Worked independently*
- *Used good keyboarding habits*
- *Completed warm-up, exit ticket*
- *Joined classroom conversations*
- *[tried to] solve own problems*
- *Decisions followed class rules*
- *Left room as s/he found it*
- *Higher order thinking: analysis, evaluation, synthesis*
- *Habits of mind observed*

Steps

Time required: ***45 minutes in one sitting or spread throughout the week with a block of 30 minutes for blogging***

Class warm-up: ***Keyboarding homerow on class typing program***

_____Start Hardware Assessment. Give students 5-10 minutes. Remind them spelling counts. Remind them if they are unhappy with their score, they can retake for full credit. This is called the **Mulligan Rule**, taken from golf. It's always interesting to see which students understand this 'do over'. See poster in Appendix.

_____When students finish the hardware assessment, return to keyboarding using Dance Mat Typing, Popcorn Typer, or another online site that **focuses on one row at a time** while the rest of the class finishes. Students used these last year so should be able to begin independently (Google for website addresses or visit Ask a Tech Teacher's resources pages for *Keyboarding*).

_____Turn music on to establish a typing rhythm for students. Encourage them to type with the beat.

_____While keyboarding, sign up for Problem-solving Board—starts next week. Remember 3rd and 4th grade? This is the first of three Presentation Boards this year:

- *Post sign-up sheets by the class door where they're easily found. Include slips of paper (Figure 28) that students can track important information. If students have workbooks, fill in the form in it with their annotation tool:*

Figure 28—Info for Problem-solving Board

My name:_____

My question: _____

My presentation date: _____

- *Alternatively, have sign-ups online where they can be shared through:*
    - *GAFE (Google Apps for Education)—either the Calendar or Spreadsheets*
    - *Google Forms*
    - *Office 365*
    - *Padlet (using calendar template)*
    - *Appointment Slots in Google Calendar that you shared with students*
- *Each student signs up for a date to present.*
- *Each student selects a unique problem they will teach classmates to solve.*
- *Students get solution from family, friends, or even teacher as a last resort.*
- *Presentation date: Students tell classmates problem, how to solve it, take questions.*
- *Entire presentation takes about three minutes.*
- *Review grading.*

_____Students may sign up in groups, as long as there is one problem per group member.

_____Load a digital copy of the Presentation assessment (*Assessment 8*) for each student onto your iPad and then use an annotation tool like iAnnotate or Adobe Reader to assess.

Assessment 8—Problem-solving Board rubric

PROBLEM SOLVING BOARD

Grading Rubric

Name: _____

Class: _____

Knew question	_____
Knew answer	_____
Asked audience for help if didn't know answer	_____
No umm's, stutters	_____
Look audience in eye	_____
No nervous movements (giggles, wiggles, etc.)	_____
No nervous noises (giggles,)	_____
Overall	_____

_____*Figure 29* is an example of the types of problems you may include:

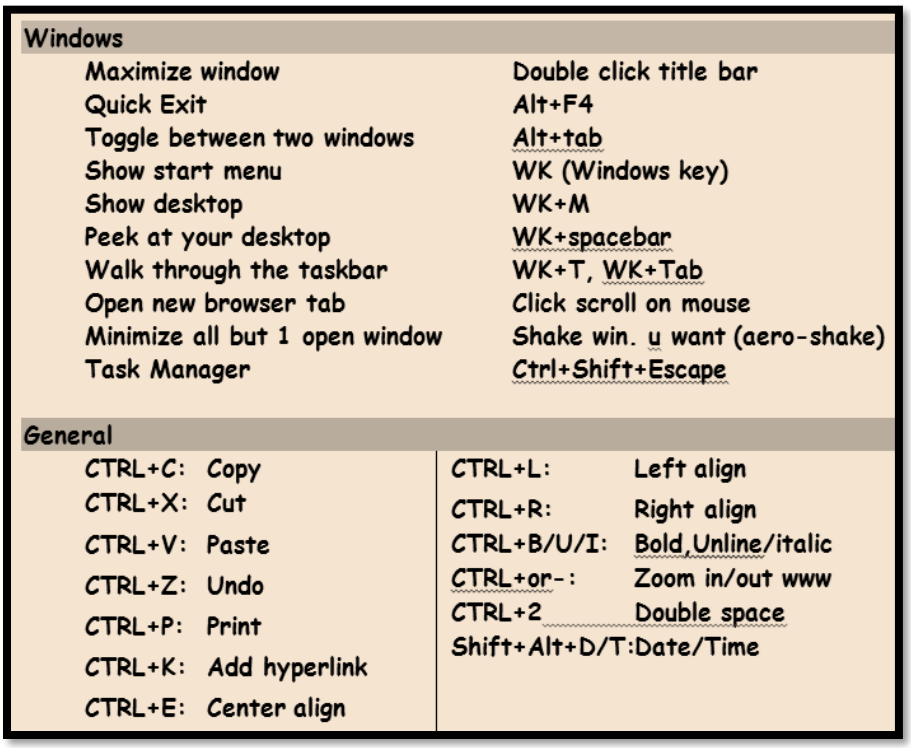
Figure 29—Common computer problems

Common Computer Problems	
What if the double-click doesn't work	What is protocol for email subject line
What if the monitor doesn't work	What does 'CC' mean in an email
What if the volume doesn't work	How do I exit a screen I'm stuck in
What if the computer doesn't work	How do I double space in Word
What if the mouse doesn't work	How do I add a footer in Word
What's the right-mouse button for?	How do I add a watermark in Word
What keyboard shortcut closes program	How do I make a macro in Word
How do I move between cells/boxes?	How do I add a border in Word
How do I figure out today's date?	How do I add a hyperlink in Word
What if the capital doesn't work	Keyboard shortcuts for B, I, U
What if my toolbar disappears	What if the program disappears
What if the document disappears	What if the program freezes
Keyboard shortcut for 'undo'	What is the protocol for saving a file
How do I search for a file	

_____A little background: Problem-solving Board covers tech issues faced during class, as they happen. As you move through the year, collate a list of problems for next year's Board. Start with the problems students suggested as a class exit ticket after Week #1. Include problems students had with tech in homework, at home as they used tech for a school assignment, or problems they had with classroom computers.

_____Include shortkeys like *Figure 30*:

Figure 30—Common shortkeys



Windows	
Maximize window	Double click title bar
Quick Exit	Alt+F4
Toggle between two windows	Alt+tab
Show start menu	WK (Windows key)
Show desktop	WK+M
Peek at your desktop	WK+spacebar
Walk through the taskbar	WK+T, WK+Tab
Open new browser tab	Click scroll on mouse
Minimize all but 1 open window	Shake win. u want (aero-shake)
Task Manager	Ctrl+Shift+Escape

General			
CTRL+C:	Copy	CTRL+L:	Left align
CTRL+X:	Cut	CTRL+R:	Right align
CTRL+V:	Paste	CTRL+B/U/I:	Bold,Unline/italic
CTRL+Z:	Undo	CTRL+or-:	Zoom in/out www
CTRL+P:	Print	CTRL+2	Double space
CTRL+K:	Add hyperlink	Shift+Alt+D/T:	Date/Time
CTRL+E:	Center align		

_____Problem solving will be addressed in more detail in the ***Problem-solving*** lesson.

_____All Board presentations in this curriculum are independent investigation, risk-taking for cautious students who feel a Right Answer lives out there somewhere. They also provide an authentic method of practicing presentation skills discussed in Common Core under 'Speaking and Listening'.

_____When all students are signed up, review speed quiz results.

_____Any evidence of learning to post on Evidence Board?

_____Introduce the concept of 'blogging'—short articles published online, enhanced with images or videos, with the express purpose of sharing ideas and garnering feedback. In the case of 5th graders, you are particularly interested in their facility to:

- *engage effectively in collaborative discussions with diverse partners*
- *build on others' ideas*
- *express their own ideas clearly*

_____Blogging provides this opportunity.

_____Review the article at lesson end on ***"13 Ways Blogs Teach Common Core".***

_____Before beginning, students must sign an agreement similar to *Fifth Grade Blogging Rules (Assessment 9*). Ask them to discuss the agreement with parents and bring it to school before the next class. If you're using workbooks, students can sign the copy in there, take a screenshot, and email that to you.

_____Students can create blogs in Edublogs, Class Blogmeister, Blogger (latter comes with GAFE)—Google for addresses. Teacher sets up class account. It can be public or private, the latter providing a safe, walled garden for students to share information and comment on each other's work.

_____Students use blogs for reflection, sharing digital tools (like Vokis, Animotos), posting and sharing Google Docs (through embed feature), collaborating on work, commenting on projects of classmates, and more.

_____Before beginning, circle back on discussions about Internet privacy, and digital rights and responsibilities. This is covered in more detail in the lessons on **Internet Search**.

_____Students can create a profile picture with an avatar creator *like Figure 31* (Google for address, use your favorite, or visit Ask a Tech Teacher's resource pages for *Digital Citizenship>Avatars*):

Figure 3--Avatar

- *Monster yourself*
- *Voki yourself*
- *With comics (like Storyboard That!)*

_____Follow good digital citizenship habits: Make the avatar look nothing like the student!

_____These can be used in student blogs or other digital platforms that require a profile picture.

_____While blogging, students will:

- *follow agreed-upon blogging rules)*
- *write articles based on evidence from a variety of resources*
- *contribute to discussion and/or elaborate on others' remarks by adding comments to the posts of classmates*

_____Studies show blogs (i.e., *Figure 32*) 1) attract a wider audience than traditional reading venues, 2) improve student writing skills by making it fun and hip, 3) incorporate discovery into education, and 4) draw learners into self-guided discussions. Blogs require critical thinking and give content ownership to students.

_____Here are other skills students learn from blogging:

Figure 4--Student blog

- *how to protect privacy*
- *about their Digital Footprint*
- *how to embed information*

_____Discuss blogging netiquette—like email etiquette:

- *be polite*
- *use good grammar and spelling*
- *don't write anything everyone shouldn't read (school blogs are private, but get students used to the oxymoron of privacy and the Internet)*

_____Students sign onto their blog account.

_____Start by showing students your blog. Have several entries that tie into class inquiry. Ask students to select an entry and post a comment. Continue this over a period of several days. Encourage students to respond to classmates with supportive and positive comments.

_____Next, students post a blog about themselves. Only provide information they are comfortable sharing. Include images, video, or music. Make this self-directed as you encourage students to explore widgets and tools available on blog.

_____Remind students to practice good keyboarding as they type the entry.

_____Once a month, have students post an article that discusses an inquiry topic. Additionally, students should visit and comment on five classmate blogs.

_____Student comments aren't always appropriate? Set account so you approve comments before they go live. And, chat with students about how supportive comments contribute to the conversation.

_____Occasionally throughout the year, use the Student Blogs Rubric *(Figure 33* and *Assessment 10)* to assess student progress.

_____How students access their blog will be slightly different if they use a computer (PC, Mac, even a Chromebook) or an iPad. IPad's will access the blog via an app, which often has different steps to accomplish a goal and often has different skills available than computers or Chromebooks. Accommodate instructions for which digital device students are using.

_____If you teach in a lab, have a student post a reminder on the class calendar to bring the science book next week for a lesson on outlining.

_____Remind students to transfer knowledge to classroom or home.

Figure 5--Blogging rubric

CRITERIA	Exemplary	Proficient	Partially	Incomplete	POINTS
Relevance of Content to Students and Parents	9 points • Content has useful information • Content is clear, concise; points readers to up to date resources. • Blog is updated frequently	6 points • Content points readers to quality resources, is informative • Resources are clearly described so readers can navigate easily	3 points • Content points to unrelated information. • Resources are not clearly described so readers cannot navigate easily.	0 points • Resources pointed to are inaccurate, misleading or inappropriate • Annotations are missing, do not describe what is found	
Use of Media	6 points • Media enhance content and interest. • Creativity enhances content	4 points • Most media enhance content. • Most files show creativity	2 points • Some media don't enhance content. • Some use of creativity is evident to enhance content.	0 points • Media are inappropriate or detract from content.	
Fair Use Guidelines	6 points Fair use guidelines are followed with proper citations.	4 points Fair use guidelines are frequently followed; most material is cited.	2 points Sometimes fair use guidelines are followed with some citations.	0 points Fair use guidelines are not followed. Material is improperly cited.	
Links	3 points All links are active and functioning.	2 points Most links are active	1 point Some links are not active.	0 points Many links are not active.	
Layout and Text Elements	3 points • Fonts are easy-to-read • Use of bullets, italics, bold, enhances readability. • Consistent format throughout	2 points • Sometimes fonts, size, bullets, italics, bold, detract from readability. • Minor formatting inconsistencies exist	1 point • Text is difficult to read due to formatting	0 points • Text is difficult to read with misuse of fonts, size, bullets, italics, bold • Many formatting tools are misused	
Writing Mechanics	3 points No grammar, capitalization, punctuation, spelling errors	2 points Few grammar, capitalization, punctuation, and spelling errors	1 point 4+ errors in grammar, capitalization, punctuation, and spelling	0 points More than 6 grammar/ spelling/ punctuation errors.	
				TOTAL POINTS	6/36

Class exit ticket: ***Have students email you their Problem-solving Board date and question.***

Differentiation

- *Add Important Keys quiz (next week) to calendar.*
- *Have students label each computer part on assessment as 'input' or 'output'.*
- *If homework is due, make sure it's added to class calendar.*
- *Early finishers: visit class internet start page for websites that tie into classwork. Add an after-school blogging group to help students get started. Ask Middle School students to help out.*
- *Consider letting students work in groups as they build their class blog.*
- *If you don't have student blogs, replace with 4th Grade Lesson #4 Book Reviews by the Characters in curriculum extenders (from Structured Learning).*
- *If you don't have student blogs, replace this lesson with 4th Grade Lesson #5 IPads 101 in curriculum extenders (from Structured Learning).*
- *If you don't have student blogs, replace this lesson with 5th Grade Lesson #1 Scratch in curriculum extendors (from Structured Learning).*

Assessment 9—Student blogging agreement

Fifth Grade Blogging Rules
(adapted from Academy of Discovery)

1. I will not give out any information more personal than my first name
2. I will not plagiarize; instead I will expand on others' ideas and give credit where it is due.
3. I will use language appropriate for school.
4. I will always respect my fellow students and their writing.
5. I will only post pieces that I am comfortable with everyone seeing.
6. I will use constructive/productive/purposeful criticism, supporting any idea, comment, or critique I have with evidence.
7. I will take blogging seriously, posting only comments and ideas that are meaningful and that contribute to the overall conversation.
8. I will take my time when I write, using formal language (not text lingo), and I will try to spell everything correctly.
9. I will not bully others in my blog posts or in my comments.
10. I will only post comments on posts that I have fully read, rather than just skimmed.
11. I will not reveal anyone else's identity in my comments or posts.

Any infraction of the Fifth Grade Blogging Rules may result in loss of blogging privileges and an alternative assignment will be required.

Student Signature _____ Date _____

Assessment 10—Blog grading rubric

Student Blog Rubric

Adapted from University of Wisconsin-Stout

Evaluation scale:

Exemplary:	*32-36 points*
Proficient:	*28-31 points*
Partially Proficient or Incomplete:	*< 28 points (resubmit)*

CRITERIA	Exemplary	Proficient	Partially	Incomplete	POINTS
Relevance of Content to Students and Parents	***9 points*** ▪ *Content has useful information* ▪ *Content is clear, concise; points readers to up to date resources.* ▪ *Blog is updated frequently*	***6 points*** ▪ *Content points readers to quality resources, is informative* ▪ *Resources are clearly described so readers can navigate easily*	***3 points*** ▪ *Content points to unrelated information.* ▪ *Resources are not clearly described so readers cannot navigate easily.*	***0 points*** ▪ *Resources pointed to are inaccurate, misleading or inappropriate* ▪ *Annotations are missing, do not describe what is found*	
Use of Media	***6 points*** ▪ *Media enhance content and interest.* ▪ *Creativity enhances content*	***4 points*** ▪ *Most media enhance content.* ▪ *Most files show creativity*	***2 points*** ▪ *Some media don't enhance content.* ▪ *Some use of creativity is evident to enhance content.*	***0 points*** ▪ *Media are inappropriate or detract from content.*	
Fair Use Guidelines	***6 points*** *Fair use guidelines are followed with proper citations.*	***4 points*** *Fair use guidelines are frequently followed; most material is cited.*	***2 points*** *Sometimes fair use guidelines are followed with some citations.*	***0 points*** *Fair use guidelines are not followed. Material is improperly cited.*	
Links	***3 points*** *All links are active and functioning.*	***2 points*** *Most links are active*	***1 point*** *Some links are not active.*	***0 points*** *Many links are not active.*	
Layout and Text Elements	***3 points*** ▪ *Fonts are easy-to-read* ▪ *Use of bullets, italics, bold, enhances readability.* ▪ *Consistent format throughout*	***2 points*** ▪ *Sometimes fonts, size, bullets, italics, bold, detract from readability.* ▪ *Minor formatting inconsistencies exist*	***1 point*** ▪ *Text is difficult to read due to formatting*	***0 points*** ▪ *Text is difficult to read with misuse of fonts, size, bullets, italics, bold* ▪ *Many formatting tools are misused*	
Writing Mechanics	***3 points*** *No grammar, capitalization, punctuation, spelling errors*	***2 points*** *Few grammar, capitalization, punctuation, and spelling errors*	***1 point*** *4+ errors in grammar, capitalization, punctuation, and spelling*	***0 points*** *More than 6 grammar/ spelling/ punctuation errors.*	
				TOTAL POINTS	/36

Article 8—13 Ways Blogs Teach Common Core

13 Ways Blogs Teach Common Core

If you aren't blogging with your students, you're missing one of the most effective tools available for improving student literacy and math. Blogs are easy to use, fun for students, encourage creativity and problem-solving, allow for reflection and feedback, enable publishing and sharing of work, and fulfill many of the Common Core Standards you might be struggling to complete. Aside from math and literacy, Common Core wants students to become accomplished in a variety of intangible skills that promote learning and college and career readiness. Look at these 13 benefits of blogging and how they align with Common Core:

1. **provide and get feedbac**k—building a community via comments is an integral part of blogging. If you didn't want feedback, you'd publish a white paper or submit work the old fashioned hard copy way. When students publish their ideas in blogs, other students, teachers, parents can provide feedback, join the conversation, and learn from the student.
2. **write-edit-review-rewrite**—teachers don't expect students to get it right the first time. Part of the writing process is revising, editing, rewriting. This is easy with blogs. Students publish a topic, collect comments, incorporate these ideas into their own thinking, and then edit their post.
3. **publish**—the idea that student work is created for a grade then stuffed away in a corner of their closet is disappearing. Current educators want students to publish their work in a way that allows everyone to benefit from the student's knowledge and work. There are many ways to do that—blogs are one of the easiest.
4. **share**—just like publishing, students no longer create for a grade; they share with others. Blogs allow for sharing of not only writing, but artwork, photography, music, multimedia projects, pretty much anything the student can create.
5. **collaborate**—blogs can easily be collaborative. Student groups can publish articles, comment on others, edit and rewrite. They can work together on one blog to cover a wider variety of topics and/or make its design attractive, appealing and enticing to readers.
6. **keyboarding**—blogs are small doses of typing—300-500 words, a few dozen for comments. This is an authentic opportunity to practice the keyboarding skills students will need for Common Core Standards in 4th grade and up.
7. **demonstrate independence**—blogs are about creativity. No two are alike. They offer lots of options for design and formatting so students can tweak it to their preference. Because they are open 24/7, students can do blog work when it suits them, not in the confines of a 50-minute class.
8. **build strong content knowledge**—blog posts can be drafted as the student collects information, posted when the student is ready. Links can be included to provide evidence of student statements, as well as linkbacks for reference and deeper reading for interested students.
9. **respond to the varying demands of audience, task, purpose, and discipline**—Students can create their work in whatever digital tool fits the audience, task, purpose they are focused on, and then embed it into their blog post. This is possible even in a simplified blogging platform like Kidblog. Most online tools (such as Voki, Wordle, and Tagxedo) provide the html codes that can be easily placed in the blog

post. Then, the student at their option can focus on presenting their ideas as music, art, photos, text, an infographic, a word cloud—whatever works for their purposes.

10. **comprehend as well as critique**—student bloggers are expected to critique the posts of others by thoroughly reading the post and commenting based on evidence. If the reader doesn't understand, they ask questions in the comments. This insures that when they evaluate the post, they have all the information required to reach a conclusion.

11. **value evidence**—blogs make it easy to provide all the necessary evidence to support a point of view. Students can link back to sources to provide credit and link to experts to provide credibility for statements. In fact, in the blogosphere, good bloggers are expected to do this as a means of building credibility for opinions they write
12. **use technology and digital media strategically and capably—**certainly, blogs are great for writing, but they're also excellent as digital portfolios to display student work developed in a variety of places. Students pick the technology that fits what they're expected to accomplish in a class, then publish it to the blog. Have you seen the movies students put together on a topic? Some are amazing.
13. **understand other perspectives and cultures**—blogs are published to the Internet. Even private blogs are accessed by many more people than possible with a hand-written paper. Students write knowing that people of all cultures and perspectives will read their material, knowing they can add comments that share their beliefs. This encourages students to develop the habit of thinking about *perspective* as they write.

Don't try all of this at once. Spiral into it, starting in second or third grade. Let their blogging grow with their intellectual skills.

Basics of Posts

Blogs used to be too cutting edge for pedestrian rules like grammar and spelling. That's not true anymore. Before students write their first post, remind them:

- *make content pithy*
- *use correct spelling and grammar*
- *avoid slang*
- *appeal to readers with content and design*
- *interact with readers via questions in the blog and answering comments*
- *avoid mistakes, redundancies, jerky flow by proof reading*

Blogs are everything you want in a school activity—student-centered, independent, supportive of problem solving and creative thinking, transferable to many classes and home activities. If you have questions, add them to the comments. I'll see if I can help.

Pages intentionally omitted

Lesson #6 Problem Solving

Vocabulary	Problem solving	Skills
• *Cerebrally-stimulating* • *Habits of mind* • *Inductive reasoning* • *Irrelevant* • *Life skill* • *Relevant*	• *I tried to solve the problem, but couldn't* • *I asked for help and the person didn't know the answer* • *Nothing works!*	**New** *Using a poll* **Scaffolded** *Problem solving* *Keyboarding*
Academic Applications *Any class, school and life, college and career*	**Materials Required** *keyboard program, Problem Solving Board rubrics, Evidence Board badges, student workbooks (if using)*	**Standards** *CCSS Standards for Math. Practice* *NETS: 4a, 5c*

Essential Question

How do I solve a problem I've never seen before?

Big Idea

Problem solving is 'cerebrally-stimulating'—and fun!

Teacher Preparation

- Know which tasks weren't completed last week and whether they are necessary to move forward.
- Have Important Keys quizzes ready to review.
- Be prepared to use domain-specific tech vocabulary.
- Know whether you need extra time to complete lesson.
- Ask grade-level team and parents if there are any tech problems students need help with.
- Collect words students don't understand for Speak Like a Geek. Use a physical Vocabulary Wall (i.e., a bulletin board) or a virtual wall like Padlet. Let students add words independently.

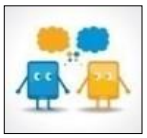
Assessment Strategies

- *Anecdotal*
- *Committed to solving own problems*
- *Decisions followed class rules*
- *Left room as student found it*
- *Completed warm-up, exit ticket*
- *Joined classroom conversations*
- *Higher order thinking: analysis, evaluation, synthesis*
- *Habits of mind observed*

Steps

Time required: ***45 minutes in one sitting or spread throughout week with 30 minutes set aside for Problem Solving discussion and activities***

Class warm-up: ***Ask students to solve a class-specific problem (say, how to get to Thursday's field trip) using a strategy in Figure 42***



_____Practice home row using DanceMat Typing, Typing Home, or Popcorn Typer (Google for website). Observe student posture, elbows at side, hand position.

_____Turn music on to establish a typing rhythm for students. Encourage them to type at the speed of the beat.

_____Continue Problem-solving Board presentations. Review expectations and grading.

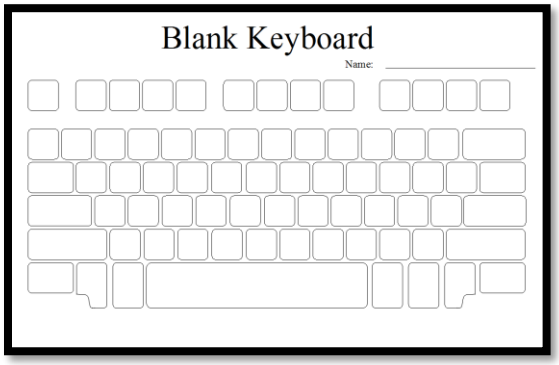
_____Any students have tech problems they'd like to share?

_____Any evidence of learning to post on Evidence Board?

_____Review results of Important Keys quiz with students. Discuss grading.

_____Give students blank keyboard quiz (*Figure 41* is a thumbnail—full size in Keyboarding Lesson). They can work in groups. Flip all keyboards over so no one is tempted.

Figure 41—Blank keyboard quiz



_____If students are using workbooks, they can fill in the template found there.
_____Since students will take this multiple times this year, treat it as you do the speed/accuracy quiz: This first quiz is a benchmark. Next will be graded on improvement.
_____Discuss Problem Solving. This is a life skill that transcends a subject.
_____Discuss what it means to be a 'problem solver'. Who do students go to when they need a problem solved? Parents? Do students believe that person gets it right more often than others? Would they believe most people are wrong half the time?
_____Review the two articles at the end of the lesson:

- ***"How to Teach Students to Problem Solve"***
- ***"How Minecraft Teaches Problem Solving"***

_____Problem solving is closely aligned with logical thinking, critical thinking, reasoning, and habits of mind. Discuss why students should become problem solvers.
_____Discuss characteristics of a 'problem solver' (from Common Core):

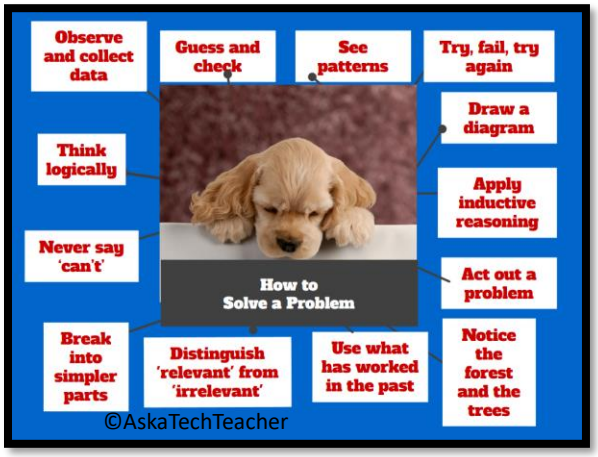
- *Use appropriate tools strategically.*
- *Attend to precision.*
- *Make sense of problems and persevere in solving them.*
- *Value evidence.*
- *Comprehend as well as critique.*
- *Understand other perspectives.*
- *Demonstrate independence.*

_____Discuss student responsibility to make up missed classes. How is this 'problem solving'?
_____Discuss why you ask students to solve hardware problems independently.
_____Discuss common problems students will be expected to solve by the end of 5th grade by referring to those included in the Problem-solving Board.
_____Problems at the beginning of weekly lessons relate to the activities they will complete during the week. They may or may not be different/the same as those on the Problem-solving Board. By the

end of each lesson, expect students to solve these independent of assistance.

_____See *Figure 42* for list of ***How to Solve a Problem*** (full size in appendix):

Figure 42—How to solve a problem



_____When students face a problem, use *Figure 42* strategies to solve it before asking for assistance.

_____Discuss 'Big Idea': Is problem solving 'cerebrally-stimulating? Is it fun? Why or why not? Discuss great quotes in *Figure 43*.

Figure 43—Problem-solving quotes

Great Quotes About Problem Solving

"In times like these it is good to remember that there have always been times like these."
— Paul Harvey *Broadcaster*

"Never try to solve all the problems at once — make them line up for you one-by-one.
— Richard Sloma

"Some problems are so complex that you have to be highly intelligent and well-informed just to be undecided about them."
— Laurence J. Peter

"Life is a crisis - so what!"
— Malcolm Bradbury

"You don't drown by falling in the water; you drown by staying there."
— Edwin Louis Cole

"The significant problems we face cannot be solved at the same level of thinking we were at when we created them."
— Albert Einstein

"It is not stress that kills us. It is effective adaptation to stress that allows us to live."
— George Vaillant

"The most serious mistakes are not being made as a result of wrong answers. The truly dangerous thing is asking the wrong questions."
— Peter Drucker *Men, Ideas & Politics*

"The problem is not that there are problems. The problem is expecting otherwise and thinking that having problems is a problem."
— Theodore Rubin

It's not that I'm so smart, it's just that I stay with problems longer.
—Albert Einstein

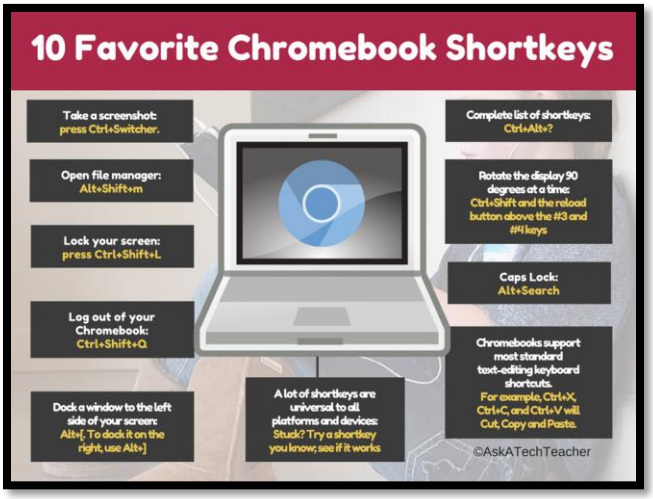
No problem can stand the assault of sustained thinking.
—Voltaire

The problem is not that there are problems. The problem is expecting otherwise and thinking that having problems is a problem.
—Theodore Rubin

Problems are only opportunities with thorns on them.
—Hugh Miller

_____Discuss shortkeys. How are these problem solving? Demonstrate this by asking students to tell you how to perform a skill. Is it easier to share the shortkey? See *Figures 44a* and *44b* for examples of platform-specific shortkeys (full-size posters in Appendix):

Figure 44a—iPad shortkeys; 44b—Chromebook shortkeys



_____Throughout class, check for understanding.
_____Remind students to transfer knowledge to other classes and home.
_____Occasionally when students have difficulty doing what you are teaching, ask why. And listen. You may be surprised by the answer.

Class exit ticket: ***Take a poll that asks students to choose problem-solving strategies they are most likely to use in the future.***

Differentiation

- *Remind students to post their Problem-solving Board problem to the Discussion Board on class website or blog where it can be a resource for other students and during the upcoming assessment.*
- *Early finishers: visit class internet start page for websites that tie into classwork.*

How to Teach Students to Solve Problems

Of all the skills students learn in school, **problem solving** arguably is the most valuable and the hardest to learn. It's fraught with uncertainty—what if the student looks stupid as he tries? What if everyone's watching and he can't do it—isn't it better not to try? What if it works, but not the way Everyone wants it to? When you're a student, it's understandable when they decide to let someone tell them what to do.

But this isn't the type of learner we want to build. We want risk-takers, those willing to be the load-bearing pillar of the class. And truthfully, by a certain age, kids want to make up their own mind. Our job as teachers is to provide the skills necessary for them to make wise, effective decisions.

It's not a stand-alone subject. It starts with a habit of inquiry in all classes—math, LA, history, science, any of them. I constantly ask students questions, get them to think and evaluate, provide evidence that supports process as well as product. Whether they're writing, reading, or creating an art project, I want them thinking what they're doing and why.

Common Core puts problem solving front and center. It comes up in ELA ("*Students will be challenged and asked questions that push them to refer back to what they've read. This stresses critical-thinking, problem-solving, and analytical skills that are required for success in college, career, and life."*), but is inescapable in Math. In fact, students cannot fully meet the Math Standards without understanding how to effectively approach the unknown. Consider the Standards for Mathematical Practice that overlay all grade levels K-12:

- *Make sense of problems and persevere in solving them*
- *Reason abstractly and quantitatively*
- *Construct viable arguments and critique the reasoning of others*
- *Model*
- *Use appropriate tools strategically*
- *Attend to precision*
- *Look for and make use of structure*
- *Look for and express regularity in repeated reasoning*

Do these sound like great strategies for more than math? How about deciding what classes to take? Or whether to make a soccer or basketball game on the weekend? Or which college to attend? Using these eight tools strategically, with precision, and tenaciously is a great first step.

The question becomes: How do students **learn to use them**? Certainly, as they accomplish their grade-level math curriculum, you as teacher remind them they aren't doing a multiplication problem (or an Algebra one); rather they're reasoning abstractly or using appropriate tools strategically, or expressing regularity in repeated reasoning. But for deep learning, hands-on authentic experience is required. Let's say, for example, the class is investigating the purchase of an MP3 player. Should they purchase an IPod, a smartphone, a dedicated use MP3 player, or a different option? How do students arrive at a decision—solve that problem? Ask students to work through the steps below as they address a decision. Ask them to note where they accomplish one or more of the Standards for Mathematical Practice above:

1. What do you want in an MP3 player? Should it play music, show videos, pictures, communicate with others, be a phone also? Make that list so you know how to evaluate information as you collect it (**compare/contrast).**
2. What do you know about the topic (**evidence**)? Have you seen some you liked or didn't like? What have you heard about those on your list? You are a good resource to yourself. Don't discount that. You'll be surprised how much you know on a variety of topics. This step is important to college and career. Future employers and schools want you to think, to use your intelligence and your knowledge to evaluate and solve problems.
3. What advice do knowledgeable friends have (**perspective taking, collaboration**)? You want the input of MP3 users. Your friends will think whatever they own is the best, because they're vested in that choice, but listen to their evidence and the conclusions they draw based on that. This is important to a team-oriented environment. Listen to all sides, even if you don't agree.
4. **Dig deeper (close reading)**. Check other resources (**uncover knowledge**). This includes:
    - *people who don't like the product*
    - *online sources. Yep, you might as well get used to online research if you aren't yet. Statistics show more people get their news from blogs than traditional media (newspapers, TV) and you know where blogs are.*
    - *your parents who will bring up topics friends didn't, like cost, longevity, reliability*
5. **Evaluate your resources (integration of knowledge**). How much money do you have? Eliminate the choices that don't fit your constraints (money, time, use, etc.) If there are several choices that seem to work, this will help you make the decision. You might have to save money or get a job so you can afford the one you've chosen. Or, you might decide to settle for a cheaper version. Just make sure you are aware of how you made the choice and are satisfied with it.
6. What are the **risks involved** in making the decision (**reflection**)? Maybe buying an MP3 player means you can't do something else you wanted. Are you comfortable with that choice?

7. **Make a decision (transfer learning)**. That's right. Make a decision and live with it knowing you've considered all available information and evaluated it logically and objectively.

Optionally, you might have students evaluate problem solving in their favorite game, say, Minecraft. All it requires is that as they play, think about what they're doing:

- *What is the goal of Minecraft? How is it best achieved*
- *What does the student know about playing the game that can be used in achieving the goal?*
- *Does working with friends and gaining feedback make life easier in Minecraft?*
- *How does experience in the game affect progress?*
- *And so on...*

This is how students become the problem solvers required of their Future. When the day comes that how they solve a problem affects the direction their life takes (college, career, marriage, children, a tattoo), they'll be happy to have strategies that make it easier.

How Minecraft Teaches Problem Solving

Recently, *Scientific American* declared "..."*not only is Minecraft immersive and creative, but it is an excellent platform for making almost any subject area more engaging.*" A nod from a top science magazine to the game many parents wish their kids had never heard of. This follows Common Sense Media's seal of approval. On the surface, it's not so surprising. Something like 80% of five-to-eight year-olds play games and 97% of teens. Early simulations like Reader Rabbit are still used in classrooms to drill reading and math skills.

But Minecraft, a blocky retro role-playing simulation that's more Lego than svelte hi-tech wizardry, isn't just the game *du jour*. Kids would skip dinner to play it if parents allowed. Minecraft is role playing and so much more.

Let me back up a moment. Most simulation games—where players role-play life in a pretend world—aren't so much Make Your Own Adventure as See If You Survive Ours. Players are a passenger in a hero's journey, solving riddles, advancing through levels and unlocking prizes. That's not Minecraft. Here, they create the world. Nothing happens without their decision—not surroundings or characters or buildings rising or holes being dug. There isn't a right or wrong answer. There's merely what You decide and where those decisions land You. Players have one goal: To survive. Prevail. They solve problems or cease to exist. If the teacher wants to use games to learn history, Minecraft won't throw students into a fully fleshed simulation of the American Revolution. It'll start with a plot of land and students will write the story, cast the characters, and create the entire 1776 world. Again, think Legos.

And still, my students hang my picture in the Teacher Hall of Fame every time I let them play Minecraft—which I do regularly. Of course, I provide guidelines. Which they love. It's fascinating that today's game playing youth want a set of rules they must beat, parameters they must meet, levels (read: standards) they must achieve, and a Big Goal (think: graduation) they can only reach after a lot of hard work, intense thinking, and mountains of problems. Look into the eyes of a fifth grader who just solved the unsolvable—something most adults s/he knows can't do. You'll remember why you're a teacher.

A note: Any time students use the Internet, start with a discussion on how to use it safely. This is especially important with multi-player games like Minecraft (you will close the system at school, but that may not be the case in the student's home). It is fairly easy for students to create their own servers (requires no hardware, just a bit of coding) and invite friends into their Minecraft world. Encourage this rather than entering an unknown server-world.

In case you must 'sell' this idea to your administration, here are three great reasons why students

should use Minecraft in school: Reading, Writing, and Problem Solving.

Problem Solving

Because Minecraft is not story-based, everything that happens requires a decision on the player's part. How well-thought out those decisions are affects what happens next. This is great motivation for critical thinking and problem solving.

Of all Minecraft's educational strengths, this may be the greatest. Players start with nothing and must build their way to security, safety, food, shelter, companionship. What a primer in problem solving. I've found throughout my teaching career that the most effective lessons are those with real-world applications. Theory makes sense to only a few and scares the rest. Here, in a world students eagerly enter, are real problems they must solve that will make a difference in their life. When a settler's wagon floods in Oregon Trail, players get another one. When they are attacked in Minecraft and have nowhere to hide because they haven't built shelter, it ruins the player's day.

That's reality.

In case you're not a Minecraft aficionado, I'll let you in on a secret: There are no manuals. Players learn by doing, failing, trying again. Suddenly, Common Core Standards for Mathematical Practice take on a whole new importance:

What Math Standard Expects	What Game Delivers
Make sense of problems and persevere in solving them	*Students work to understand and solve problems within game constructs*
Reason abstractly and quantitatively	*To play effectively requires student understand what is occurring and visualize solutions.*
Construct viable arguments and critique the reasoning of others	*The game's nature requires students interact with others to discern who can assist in achieving goals.*
Model	*Game models reality students likely will never experience, but wish they could.*
Use appropriate tools strategically	*As with real life, players must determine what tools are available (both physical and psychological) and how to use them to achieve goals*
Look for and make use of structure	*Life in the game works better with a plan*

If you're using Minecraft as a class activity, consider these best practices:

- *Expect a learning curve and plan time for one. Some students won't need it; others will.*
- *Have students work in groups. This helps non-gamers with mechanics.*

- *Be involved. Don't let gamers intimidate you from observing and directing*
- *Set behavioral expectations. Your goals are different from typical game-play. Let students know what they are.*
- *Align goals with learning. Make this clear to students.*
- *Scaffold non-gamers with groups.*
- *Update parents consistently. They will question using a game to learn reading and writing.*
- *Make failure fun. Game purpose isn't to win; it's to learn.*
- *Expect students to play in many locations. In fact, encourage that.*

There you have it—how I use Minecraft to scaffold reading, writing, and problem solving. From this beginning, you'll find unlimited applications. I have online efriends whose students use Minecraft to build molecules for a chemistry class, designs for 3D printing, and bridges for an 8th grade science project. Students quickly move beyond my list of questions to creating their own. We use Twitter as a shared resource, and students become Minecraft Tweeple, tweeting questions and answers using #hashtags. When they solve a prickly game problem, they type #problem with their name into our class Twitter stream and lay it out in 140 characters. That appears on the class screen for everyone's benefit.

One last point: I'm not going to kid you. Using Minecraft takes a commitment on the teacher's part. It's new. You're breaking ground. You'll have to talk yourself blue explaining to stakeholders why this is a good decision. You'll put long hours in researching, studying, managing, and few will thank you.

But the kids will. And when they move on, they'll remember that season with you, and how you taught them to think—I mean, let them play their favorite game.

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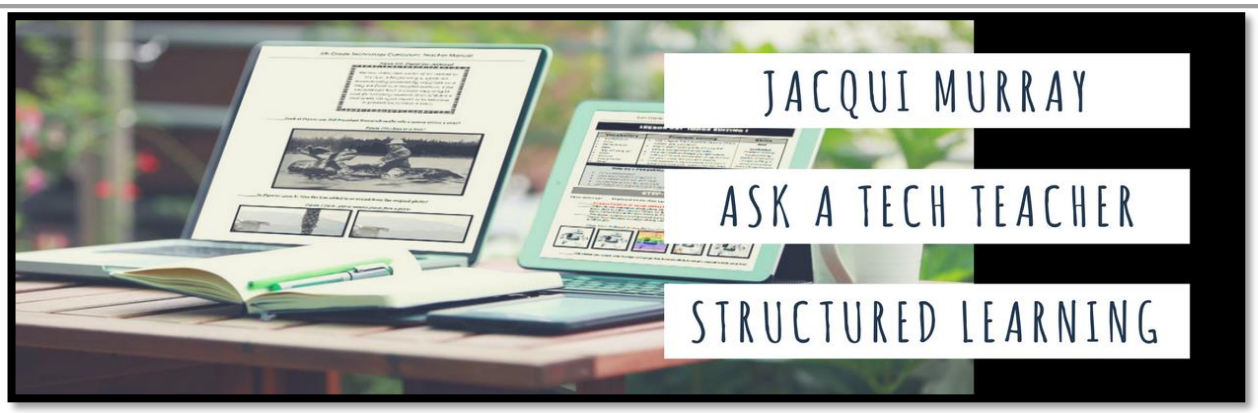

Which book	Price (print/digital/Combo)
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K-8 Student workbooks (license)	*$199 per grade level and up*
35 K-6 Inquiry-based Projects	*$31.99/25.99/52.18 + p&h*
55 Tech Projects	*$18.99 and up–digital only*
K-8 Keyboard Curriculum—3 options	*$20 and up + p&h*
K-8 Digital Citizenship Curriculum	*$29.95 and up*
CCSS—Math, Lang., Reading, Writing	*$26.99 ea*
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