

Leader Guide for The Essentials Course 1 in ST Math Academy

- This guide is designed to be used in Professional Learning Communities or by any group of teachers who want to learn about ST Math together.
- The model assumed in this guide is a group working through the modules together. You can, of course, use the online content in whatever way you wish and refer to this guide for extra information or ideas for topics to discuss or things to think about.
- The Essentials is divided into two courses. One prepares new users to implement ST Math and the second provides information that helps educators get the most out of ST Math.
- Within each unit are modules that consist of expandable sections that contain the content.

Layout of this Guide

- Overview - a brief look at what is covered in the unit.
- Preparation - anything that needs to be done before starting the unit or reminders about technical requirements. Generally, teachers will need to have internet access and, if possible, the leader will need a way to share videos and some activities with the group.
- Walk-through of module.
- Note on Conditioning - the Academy is conditioned so that signed-in users see just the content that is applicable to their position, grade level, and sign-in type. Conditioned content is shown with a light orange background. Skip the sections that don't apply to you.

Questions? Answers to technical questions and access to resources can be found at ST Math Help (help.stmath.com).

Links within this guide: You may need to allow this document to open files or websites (Mac) or, on a PC, go to Edit (not File) > Preferences > Security (Enhanced) > Add File (select this file from File Explorer).

Course 1 - Getting Started with ST Math

Unit 1 - The Power of ST Math

Overview:

- Learn the three most important things to know about ST Math.
- Play some of the games.
- Learn about the science behind ST Math including spatial-temporal reasoning, screen design, why there are no words, and its unique formative feedback.
- Finally, see what the program looks like from the students' perspective.

Preparation:

- Plan to share the videos with the whole group. Alternatively, teachers can view the videos on their personal devices.
- Teachers should have a computer or tablet with internet to access to the games and activities presented in the The Essentials courses.
- Decide whether you want teachers to:
 - play games that include puzzles from several grade levels (gives a big picture of the progressions) OR
 - play games of their own choosing from any grade level (provides the student experience but requires signing in to their ST Math account).
- Also decide how you're going to handle the quizzes that record completion of each module. You can direct participants to go back and complete them at a later time or provide time for teachers to complete them in your session. Successfully completing all the quizzes in a course will show it as complete in their My Learning section of the Academy and give them access to a certificate.

Course 1 - Getting Started with ST Math

Unit 1 - The Power of ST Math

- **Three Things You Need to Know About ST Math**
- **The Science of ST Math**
- **The Student Experience**

Unit 2 - Getting Ready

- **Getting the Best Results**
- **Getting Students Ready**
- **Planning for the First Day**

Course 2 - Monitoring Data and Supporting Students in ST Math

Unit 1 - Monitoring Data

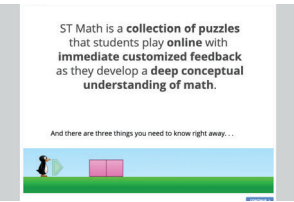
- Using Your Console
- Using Assignments
- Minutes and Puzzles

Unit 2 - Supporting Students

- The Problem Solving Process
- How and When to Help
- Finding Resources and Support

Module 1 - Three Things You Need to Know About ST Math ([link](#))

Time (23 min)	Section	What to Do:
5 minutes	Welcome to ST Math!	<ul style="list-style-type: none"> • Display (or have teachers view on their devices) the beginning of this module. • Discuss briefly the benefits of puzzles (fun), immediate customized feedback (essential to learning), and conceptual understanding (as opposed to memorization). • Go through the three things you need to know. <ul style="list-style-type: none"> • ST Math features a penguin. The penguin's name is JiJi (jee-jee). You can learn more at the Learn About: JiJi, The Penguin module but JiJi has no gender or age so that students can see this penguin as they want to. JiJi's patience empowers students and can change the culture of a district, school, and class. The poster can be downloaded using the links on that slide. • There are no instructions. Discuss with teachers if they read the instructions for the games they like to play on their phone. Probably not! Students figure out what to do and have a sense of accomplishment -- without any reading at all. The feedback tells them all they need to know. In some games there are vocabulary words (e.g., circle, equilateral) or word-type problems. But they are part of the content of the game, not instructions. In almost every game, JiJi needs help to get across the screen from left to right -- the same direction that they'll use to read. • To understand ST Math, you HAVE to play! It's impossible to understand ST Math without playing. While educators may be playing games that are from the grade level they work with, you might suggest that they try games from the 8th grade on concepts they might not have used in a while (Graphing Linear Functions anyone?). That is the best way to understand the experience of a learner in ST Math.
10+ minutes	Play some games	<ul style="list-style-type: none"> • Have teachers play! <ul style="list-style-type: none"> • The sample games include puzzles from several grade levels to give a big picture of the progressions. • Choosing what to play requires educators to sign in to their Console, and navigate to Curriculum > All Learning Objectives.



		<ul style="list-style-type: none"> • After everyone has played for about 7-8 minutes, discuss what teachers noticed about their experience using the questions provided. <ul style="list-style-type: none"> • How do you know what to do without any instructions? • Before choosing an answer, click the blue part of the screen. How does that focus your attention? • Play a few puzzles. What math concepts are being taught or reinforced? • After you click the Go button, click the screen to activate the animation controls. How can they help students think about the math behind the puzzle?
5 minutes	About that feedback	<ul style="list-style-type: none"> • The formative feedback in the games is essential to students developing a deep conceptual understanding of the content. • Display the sample game provided in the module. • Play (or have a participant play) and choose an incorrect answer. • Discuss how the feedback is different depending on the choice the player makes. • Demonstrate clicking on the screen before clicking the Go button to show the clickable areas and double clicking the screen during the feedback to bring up the animation controls.
3 minutes	FAQs	<ul style="list-style-type: none"> • Allow time for participants to read over the FAQs and discuss any questions. Consider recording the questions that can't be answered so you can return to them later. ST Math Help (support@stmath.com) is ready to help if you need support.
	Quiz	<ul style="list-style-type: none"> • Give educators a few minutes to complete the quiz or direct them to come back and complete it later. • When they complete the quiz, the module is marked as complete and a section of the Unit circle is filled in. When all modules in a course are complete, a certificate is available in My Learning at the top of the Academy page.

Module 2 - The Science of ST Math ([link](#))

Time (28 min)	Section	What to Do:
5 minutes	What is the ST in ST Math?	<ul style="list-style-type: none"> • The 56-second video presents spatial temporal reasoning (the ST in ST Math) in real life and in ST Math. • Instead of just having students memorize algorithms or rhymes, ST Math builds a conceptual understanding of mathematics through carefully designed visual models. • If appropriate, discuss what is actually involved in finding the answer to a simple problem like $5 + 2$. <ul style="list-style-type: none"> • First, you have to know that there is an abstract idea of quantity that can be applied to blocks, fingers, or dogs but doesn't really exist in the real world. You can't hold five. • Then you have to know that this squiggle (5) means $x \times x \times x \times x$ and this squiggle (2) means $x \times x$. • There's also this squiggle (+) which means to combine them. • Finally, you have to know that this squiggle (7) has to be written after the 2 line squiggle (=). • A game like Push Box (there's also a link to the game in the very first module, <i>Three Things . . .</i>) eliminates all but the first bullet point and helps students visualize the combining of stacks of blocks without any abstract symbols at all. The only requirement is one-to-one correspondence (and if students are just developing that, this game will help strengthen it). • As students continue to play, those squiggles are attached to meaningful quantities and the action of combining is attached to the plus sign. • The emphasis on spatial temporal thinking is why students are able to be successful in ST Math when they may or may not be learning from a textbook. This topic is covered in more detail in the module, <i>Where are the Words?</i>
8 minutes	Experience Spatial-Temporal Reasoning	<ul style="list-style-type: none"> • Project Upright JiJi and play the game as a group. • Present the first few puzzles and have the teachers solve them individually first, and then have one or two people tell you what to do to solve them. • As puzzle get trickier, you'll see people using their hands to move JiJi virtually -- that's when you know they're working at using spatial temporal reasoning to solve the puzzle.
2 minutes	Why is the screen so simple?	<ul style="list-style-type: none"> • Discuss that research on computer based instruction clearly shows that visual and auditory distractions have a negative impact on learning. • Participants may have experienced the effects when the cognitive load gets too high and it becomes difficult to continue doing a task or learning something. Participants may want to share their experiences. Note: Sometimes having to focus in spite of distractions (studying in a bowling alley) can be helpful. That, however, takes a motivated and experienced learner.

4 minutes	Where are the words?	<ul style="list-style-type: none"> • Spend a few minutes discussing teachers' experience with students who have limited English, especially in math. Some may have had children who struggled with everything except math worksheets because numbers and operations were the same. Others may have seen younger students love time with JiJi because they can be successful without knowing English. • It is also a powerful exercise to look at how many words are actually in your math textbooks. Educators may be surprised how much of the math content requires reading to understand. ST Math is designed to eliminate that barrier.
3 minutes	Where are the words? Slider	<ul style="list-style-type: none"> • Use the slider to discuss the progression from concrete/visual through connecting to abstract. • Math lives in our brains. You can have 5 apples or 5 pencils. But can you have 5? Five is an abstract concept that we can use to describe this many xs -- $x \times x \times x$. • Young children need to develop the conceptual understanding of, for example, five first. In ST Math, early learning games help students develop one-to-one correspondence so they start developing the concept of number. • As they develop one-to-one correspondence, they also have to learn that we have special words and squiggles that represents a certain number of objects. • The task of connecting all those things takes time. Rushing to worksheets doesn't allow students the time to make those connections between abstract concepts like number with our real-world tools that describe them. • Even in more advanced games, being able to "play" with the ideas to see what happens helps students develop a deep understanding -- much stronger than could ever come from memorization. • Once there has been time spent connecting visual/concrete models with abstract numerals and words, the models can be taken away (unless there's a really tricky problem where they might be helpful!). • This process of visual/concrete - connecting - abstract happens over and over again as students progress in mathematics. Once students understand counting and numerals, models of multiplication or fractions or even algebra are introduced in the same way. Conceptual understanding first, then learning how to express the ideas with words and symbols, and finally working with symbols that are completely abstract.

6 minutes	Why is the feedback so important?	<ul style="list-style-type: none"> Remember something that you have learned recently (e.g., how to use a new program, improve your golf shot, cook a new recipe, start a new hobby) and think about: <ul style="list-style-type: none"> How did you know you were learning or getting better? What kind of feedback did you get? How often and when did you get feedback? Was there a time when you didn't get feedback and you wanted some? What was an example of the most helpful feedback? The least helpful? How does your experience fit in with the immediate and informative feedback ST Math provides? Compare that to the feedback most students get in math class. Unfortunately, those math sheets take a few days to correct and in class, a student can answer the teacher's question incorrectly, but if they aren't called on, it's not caught. Having immediate feedback based on your answer is essential in building new knowledge. And the more educators help students get the most out of the animation, the more students will benefit.
	Quiz	<ul style="list-style-type: none"> Direct participants to go back and complete it at a later time or provide time for teachers to complete it in your session.

Module 3 - The Student Experience (link)		
Time (20 min)	Section	What to Do:
6 minutes	The Landing Page and Journey	<ul style="list-style-type: none"> This module is a quick tour. How to use these features will be covered in later modules. Even if teachers have been using ST Math, there are a lot of features that are brand new! You may want to, as a group, use one of the student test accounts listed at the end of this module to sign in and go through the features mentioned in this module. Alternatively, have teachers sign in to the demo student accounts listed below and give them a guided tour using the content in the module. They can stay in that account for the rest of this module. To view a larger version of any image in the Academy, right click the image and choose Open in new tab. Switch to that tab to view.

		<ul style="list-style-type: none"> • The Landing Page and Journey <ul style="list-style-type: none"> ▪ History ▪ Assignments ▪ Grade Level Journey • Journey Page <ul style="list-style-type: none"> ▪ Exit ▪ Full Screen ▪ Student Menu ▪ Puzzles and Minutes ▪ Objective Title ▪ Learning Objective ▪ Objective Cone (or Objective Island) ▪ Game Pillar ▪ Completed Levels ▪ Current Level
2 minutes	Quizzes	<ul style="list-style-type: none"> • Students in grades 2 and above take a quiz before beginning and after finishing an Objective. <p>The results are viewable to the student immediately and their scores are listed on the student’s History page > Replay Objectives > choose the Objective > click the icon of the paper and pencil.</p> <p>Recording sheets are available in ST Math Help.</p>
3 minutes	Toolbar Overview	<ul style="list-style-type: none"> • The Toolbar puts powerful learning tools in students’ hands and gives you a quick look at what the student has been doing: <ul style="list-style-type: none"> • Exit or Back • Full screen • Access to Student Menu • JiJis (lose both and the level starts over) • Level attempts • Farthest progress • Current progress
4 minutes	Student Menu	<ul style="list-style-type: none"> • An important feature of the Student Menu is the toggle on the Support tab to turn Auto Pause on and off. If teachers aren’t familiar with this feature, they should turn it on and play a game to see that the game freezes after they click the Go button or enter the final answer. Clicking the screen or the play button starts the animation. <ul style="list-style-type: none"> • If they don’t turn Auto Pause on, students can still see the scrub bar by double-clicking on the screen during the animation. • The Progress tab lets students see what days they have logged in during this week and the previous week. It also shows their Minutes and Puzzles for this week and the previous week and their averages.

3 minutes	Pausing Animation	<ul style="list-style-type: none"> • Pause the puzzle's animation by double clicking the screen during the animated feedback or by turning on Auto Pause (Student Menu > Settings tab). • Providing immediate feedback is one of the elements that makes computer games and sports so enjoyable. Players know right away if they were successful. It's also a vital part of learning something new correctly. Filling out a worksheet and getting a grade several days later does not provide the vital feedback learners need. • Using the animation controls will allow students to study the visual feedback and figure out for themselves what went wrong.
2 minutes	Using the Annotation Tool	<ul style="list-style-type: none"> • The annotation tool appears at the same time as the animation controls. It's helpful to introduce the tool and provide clear guidelines for its use. Having students record their thinking on the screen is a powerful tool especially if you take screenshots and use them as formative assessments. • Click the pen icon to start annotating. Click the pen icon or the play button in the animation controls to erase.
	Quiz	<ul style="list-style-type: none"> • Direct participants to go back and complete it at a later time or provide time for teachers to complete it in your session.

Resources:

Student Test Accounts (Use Student Sign In > Text Sign In at play.stmath.com and enter username and password.

K	1	2	3	4	5	6
dgold	jelliott	oryan	ebowman	jclarke	ganderson	acollins
dgold363	jelliott435	oryan283	ebowman233	jclarke480	ganderson301	acollins376
ejackson	wfrazier	rfreeman	rcastro	cdouglas	bchambers	kgraham
ejackson403	wfrazier443	rfreeman556	rcastro486	cdouglas465	bchambers975	kgraham894

- ST Math Help Data Trackers: <https://help.stmath.com/hc/en-us/articles/360050319193-Data-Trackers>

Course 1 - Getting Started with ST Math

Unit 2 - Getting Ready

Overview:

- The results of independent research are discussed and then educators learn how they can get similar results.
- How and why to introduce ST Math to students is presented along with fun resources that teachers can use to get students and their families ready to play.
- Finally, considerations for the first day are covered including usage guidelines and implementation models.

Preparation:

- Plan to share the videos with the whole group. Alternatively, teachers can view the videos on their personal devices.
- Teachers should have a computer or tablet with internet to access to the games and activities presented in the The Essentials courses.
- Decide how you're going to handle the quizzes that record completion of each module. Direct participants to go back and complete them at a later time or provide time for teachers to complete them in your session.

Module 1 - Getting the Best Results		
Time (17 min)	Section	What to Do:
2 minutes	Research Results	<ul style="list-style-type: none">• Review the bullets at the start of the module. For more information, go to the Academy's Focus On: What the Research Says or stmath.com, Outcomes.• Discuss the implications of the bolded findings, especially what it means that ST Math helped students who were behind in math increase their self-beliefs in mathematics.
2 minutes	Plan to Play	<ul style="list-style-type: none">• The most important element is getting students to play. Every study points to time on the games as what gets the results.• Discuss the research supported recommendations.<ul style="list-style-type: none">• PK/TK - 30 minutes/week• K-1 - 60 minutes/week• 2+ - 90 minutes/week• Support teachers in their planning to maximize ST Math time.• While meeting our usage goals is great, <i>any and all time students spend on ST Math has been shown to be beneficial.</i>

5 minutes	Monitor Student Performance	<ul style="list-style-type: none"> • The data presented in the Educator Console provides information about your class in general and students in specific. • Review the data shown in the teachers' Students tab. They should look at the page with the expansion arrows closed as well as open. • Be sure to have teachers practice using the sorting features. As more data is added, these tools will become more powerful. • Look for students who have puzzle or minute numbers that are different from the norm.
4 minutes	Set Goals	<ul style="list-style-type: none"> • Having students set goals can help them stay on track. Discuss what makes a good goal and work together to come up with ideas for goals the teachers can use. • If appropriate, visit ST Math Help and search for Data Trackers (go right there). There are several different versions for all age groups and guides to their use.
4 minutes	Celebrate Success	<ul style="list-style-type: none"> • There's a lot more to celebrate than just minutes and puzzles. Since ST Math promotes problem solving, perseverance, and productive struggle, those successes should also be celebrated. • Point teachers to help.stmath.com and Celebration Notes for a selection of fun cards (including an Elvis JiJi).
	Quiz	<ul style="list-style-type: none"> • Direct participants to go back and complete them at a later time or provide time for teachers to complete them in your session.

Resources:

- ST Math Help Data Trackers: <https://help.stmath.com/hc/en-us/articles/360050319193-Data-Trackers>
- ST Math Help Celebration Notes: <https://help.stmath.com/hc/en-us/articles/360049543254-Celebration-Notes>

Module 2 - Getting Students Ready

Time (varied)	Section	What to Do:
6 minutes	Introducing ST Math (and the Picture Password)	<ul style="list-style-type: none"> • Be sure your teachers know that introducing ST Math to their students is very important. A computer game for math with no words and having to get every single puzzle correct before moving on is something brand new for their students. • Three suggestions are provided. Share a quick overview of each one and then allow teachers time to explore their choice. <ul style="list-style-type: none"> • Using Our Guided Intro -- Teachers can just project/share the web page that provides a fun gamer-style video, information about the games, and the opportunity to play some games together. • By Playing a Game Together -- Give teachers time to go through their curriculum to find a game that they can project/share and solve as a group. Some points to include in the discussion are provided. • Using a Video (English or Spanish) -- If teachers prefer to introduce it in their own way, they may still enjoy sharing the videos in the Guided Intro to get students excited. • Since family support is so important, have teachers review the Family Introduction activity.
10 minutes	Your Students Will Be Using a Picture Password. What's That?	<ul style="list-style-type: none"> • Picture Passwords are a unique way for students to sign in to ST Math. Students of all ages, even those who can't read yet, are able to sign in all by themselves once they learn to recognize the images in their special picture password. • If your teachers are new to picture passwords, they may have a lot of questions. Share the Five Awesome Facts about Picture Passwords in the Academy Module Learn About: Picture Passwords for the Win. • Explain that the most important key to success is the teacher's confidence that their students can learn their password. Although it may seem daunting at first, many kindergarten and first grade teachers prefer the picture password because it enables students to sign in all by themselves. • So they understand how the Picture Password training works, go through the Picture Password Training Experience individually or as a group. Caution teachers that they should not use that activity with students because students will be confused as to which Password they should learn. • There is also a short video that can be used to introduce students to the Picture Password. Share that video so teachers can decide whether they would like to use it. • Finally, if necessary, teachers can go to the student's page in their Educator Console and, under the Actions menu (the blue circle and key), View Picture Password, and then print it for students.

	Quiz	<ul style="list-style-type: none"> • Direct participants to go back and complete them at a later time or provide time for teachers to complete them in your session.
<p>Resources:</p> <ul style="list-style-type: none"> • Guided intro: https://play.stmath.com/raft/resources/interactive_activities/guided_intro/index.html • Picture Password intro video: https://play.stmath.com/raft/resources/videos/pp_intro.mp4 • Picture Password Training Experience (teachers only): https://play.stmath.com/raft/resources/interactive_activities/pp_simulation/index.html 		

Module 3 - Planning for the First Day		
Time (varied)	Section	What to Do:
5 minutes	Intro	<ul style="list-style-type: none"> • The Intro section provides an overview of what teachers should do before starting to use ST Math. • True story: A parent walked into the school office with flowers and treats for the new teacher who was making such a difference in her daughter’s attitude toward school and math. The teacher’s name? Miss JiJi.
varied	How Will You Be Using ST Math?	<ul style="list-style-type: none"> • NOTE: There are planning sheets and checklists available in this Academy module. The page is conditioned to show only the correct versions for your sign-in type. You can decide if they would be a helpful addition to your planning. • Use the information in the sections to inform your discussion of how ST Math will be used in your situation. <ul style="list-style-type: none"> • Computer Lab • Small Group Intervention • Rotation • Whole Class • Remote Learning (Refer interested teachers to the Focus On: Teaching Remotely with ST Math link on the Academy home page.)
Text Only 2 minutes	Here’s What You’ll Need To Do On or Before Day 1	<ul style="list-style-type: none"> • On Day 1, teachers will provide each student with their text username and password which has been provided by the school/district. • Students will click on Text Sign In and then enter their credentials. • They’ll start their Journey (with a quiz for grades 2+).
SSO (e.g., Clever or Classlink) Only 2 minutes	Here’s What You’ll Need To Do On or Before Day 1	<ul style="list-style-type: none"> • On Day 1, students will log into their SSO account and click on the ST Math icon (an image of JiJi).

<p>Picture Password Only 10+ minutes</p>	<p>Here's What You'll Need To Do On or Before Day 1</p>	<ul style="list-style-type: none"> • Teachers using Picture Passwords will first need to create a class. • If students already have an ST Math account and are at the same school, teachers will be able to search for their students by name and add them. • Otherwise, when they're ready to add students, they will create an Invitation Code, give that code to students, and the students will add themselves to the teacher's class and begin Password Training. • Because it's easy to create Invitation Codes and add and delete students, you might want to actually walk through the process with your teachers: <ul style="list-style-type: none"> • Follow the steps in the slideshow in this module to create a class, create an Invitation Code, have teachers use the Invitation Code to sign in and begin to learn their picture password. • When the activity is done, you can click on the name of each teacher who joined your class and go to Settings. Click the trash can next to their name in the Classes section to remove them from that class. • NOTE: Be sure to stress that students need enough time to learn their Picture Password on that first day.
<p>Text to Picture Password Only 3 minutes</p>	<p>Here's What You'll Need To Do On or Before Day 1</p>	<ul style="list-style-type: none"> • On Day 1, teachers will provide each student with their text username and password which has been provided by the school/district. • Students will click on Text Sign In and then enter their credentials. • They will automatically begin Password Training which should be completed during their initial session.
<p>4 minutes</p>	<p>And don't forget your students' families!</p>	<ul style="list-style-type: none"> • Involving families is important, especially since ST Math is so different from other online math programs. To help students access the program at home, there are letters home that can be used. Teachers who are logged in to the Academy will see only the type of letter they need. To see other versions, go to ST Math Help (help.stmath.com). • Take a few minutes to go through the online introduction for families which is designed to help those new to ST Math understand how it works. • Teachers can easily share the abbreviated link: bit.ly/welcome_stmath.
	<p>Quiz</p>	<ul style="list-style-type: none"> • Direct participants to go back and complete them at a later time or provide time for teachers to complete them in your session.