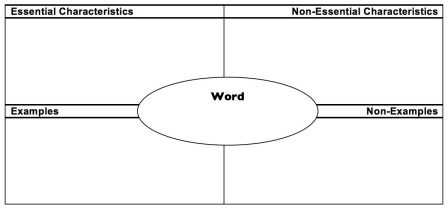
CTSS Tier 1 Math Intervention Strategies	
Explicit Methods of Instruction	● -Balance between student-centered learning & teacher-led instruction ● -Think alouds ● -Corrective Feedback ● -Multiple examples & demonstrations ● -Differentiated Lesson delivery (provide multiple opportunities for guided practice) ● -Guided practice (can occur through classwide peer tutoring or teacher guided) ● -Students receive explicit feedback & corrective instruction for any mistakes ● -Reteach if students are struggling ● -Stations/Centers (independent opportunity to build proficiency and fluency)
When overall skills are lower than grade level:	● Assess for level of instruction ● Provide differentiated small group instruction of needed skills
How to Differentiate Tier 1 Core Instruction:	● **<u>Math Workshop</u>** ○ **Mini-Lesson:** ■ Number Sense Routine ■ Connection ■ Teaching Active Involvement ■ Linked to the Independent Work Time ○ **Work Time:** ■ Independent/Partner work; Must Dos/May Dos; Stations/Centers; Problem-Solving Tasks ■ Needs-Based Strategy Groups; Small Group Instruction; Guided Math ■ Student-Teacher Conferences ○ **Sharing & Closure:** ■ Students share strategies, ask questions, connect, reflect ● **<u>Effective Teacher Prompts:</u>** ○ **Clarify students' ideas** – Restate students' ideas as questions to confirm and highlight their thinking. Insert precise mathematical language into students' comments. ○ **Emphasize reasoning** – Ask for explanations, connections, agreement and disagreement. Ask whether students' responses are correct or incorrect. ○ **Encourage student-student dialogue** – Turn and talk with a partner about connections, agreement and disagreement, confusion. Ask for peers to ask each other clarifying questions and to rephrase each other's ideas. Practice explanations with a partner.

	● **CSA or CRA:** ○ Begin instruction with **concrete representations** (manipulatives) and tools. ○ Move to **semi-concrete representations** or **representational** (drawings, picture models). ○ Then, move to **abstract representations** by using only numerals, equations, or mental math. ○ Cycle back to concrete as needed and as new skills/concepts are introduced. Ask questions that make connections among the concrete, semi-concrete, and abstract representations. ● **Model** ○ Specific skills and strategies for using tools (e.g., rulers), manipulatives (e.g., base-ten blocks), and strategies (e.g., open number line). ● **Reciprocal Teaching or peer-assisted learning:** ○ Students take turns being the teacher for a peer. ● **Slice Back** (Fuchs & Fuchs, 2001) ○ To material from a previous grade level and Ramp Up to current grade level expectations. ● **Test-Taking Strategies**: ○ Using estimation to narrow reasonable answer options, highlighters to emphasize important information, and two strategies to check accuracy of answer. ● **Press and Release:** ○ The **Press** part of a lesson is a focus on ideas, concepts, topics. The Press part should last 10-12 minutes or contain 3-4 chunks of information. The **Release** part of a lesson is a moment of release during which the student gets to process and reflect. Release could be a minute long (turn to a partner and summarize) or 10 minutes long (create a Venn Diagram to summarize). ○ The cycle of press and release continues throughout the lesson and reflects the input and quantity limitations of the brain.
Organizational Skills:	● **Organizational Skills:** ○ For recording strategies horizontally and vertically, provide graph paper or turn lined paper to create columns as needed. ● **Summarize Key Points:** ○ Using strategies such as graphic organizers, concept map, word splash, fist list, write it/draw it/apply it, label a diagram, fill-in-the-blank. ● **Slow rate of completion:** ○ Reduce number of items to complete ○ Provide manipulatives ○ Provide

	● **Difficulty Attending to Important Details:** -highlight operational signs/keywords -use vertical lines/graph paper for organization -reduce the number of problems per page -use a window overlay to isolate problems -have student repeat directions to teacher
Problem-Solving:	● **STAR:** ○ **Search** the word problem for important information (not key words). **Translate** the words into models, pictures, or symbols. **Answer** the problem. **Review** your solution for reasonableness. (Gagnon & Maccini, 2001) ● **Think-Alouds:** ○ Model and make transparent your thinking process for problem-solving decisions. Also, use think-alouds and think-pair-share for students to make transparent their own thinking process for problem-solving decisions. ● **Difficulty Solving Word Problems:** -use concrete examples -highlight key operational words -have students restate problem -use of calculator/manipulatives ● **Problems sequencing steps for computation:** -consistent review of steps -reference sheet kept at student desk -use acronyms to remember steps -color coding of steps -use of manipulative objects -use of calculator
Vocabulary:	● **Personal Word Wall Cards** (Frayer Model)  ● **Vocabulary Games:** $10,000 Pyramid, Go Fish, Charades, Pictionary, Memory/Concentration, I Spy Fly Swatter, 20 Questions ● VDOE Mathematics Vocabulary Word Wall Cards
Fluency of Facts:	● **Difficulty Remembering Math Facts:**

	-separate facts into sets of fact families -provide extra opportunities -provide references to assist in fact calculation -use manipulative objects -practice flashcards with peer/volunteer -use folding in technique for flashcard practice -student self-check/correct practice sheets
Self-Monitoring & Self-Evaluation Strategies:	● **<u>Self-Monitoring and Self-Evaluation Strategies</u>**: o Have students write their own steps for problem-solving and refer to them when solving. o Have students create graphic organizers. o Have students set goals for their own growth, create a plan to meet their goals, and complete tasks related to their goals. o Have students organize their work to refer back to and monitor their growth
Evidence-Based Practices for Sub-Groups:	**Concrete, Semi-Concrete, Abstract (CSA) Sequence** (Crawford & Ketterlin-Geller, 2008; Flores, Hinton & Strozier, 2014; Hudson, Miller, & Butler, 2006; Manel, Miller & Kennedy, 2012; Miller & Kaffar, 2011; Paulsen, 2005; Witzel, 2005) ● CSA (sometimes called CRA or CPA) is a three-phase instructional approach with each phase building on and explicitly connecting to the previous instruction. ● Concrete is the first phase when instruction focuses on using manipulatives or concrete objects. ● Semi-concrete (representation or pictoral) is the second phase when instruction connects the concrete manipulatives to drawing, pictures, and other visual representations of concrete objects. ● Abstract is the third phase when instruction connects the concrete and semi-concrete representations to using only numbers and mathematical symbols or to mentally solving problems. ● The three phases are flexible and reflective of students' readiness to explain concepts and to fluently apply strategies with different levels of representation. ● At every level, there should be parallel modeling of each representation with mathematical vocabulary and numbers. **Peer-Assisted Learning** (Fuchs, Fuchs, Yazdian, & Powell, 2002) ● The purpose of peer-assisted learning is to illuminate the decision making process of a specific strategy. ● Purposefully pair an older student or peer who has more sophisticated understandings of a concept with a student who is in need of targeted support on a specific strategy. ● Select the pair based on a particular strategy in the instructional time of need. These peer-teaching pairs should be flexible. ● The student in the teacher role should use their own language and reasoning to explain their decision making process. ● Also make sure the student in the learner role gets to be in the teacher role with a peer or younger student for a different concept (or the same concept after making gains as a learner). **Think-Alouds** (Hart et al., 2004) ● Model the steps to accomplish a task while verbalizing the thinking and reasoning that accompany the steps. ● Do not start where your thinking is. Assess and start where the student's thinking is. ● Do not simply demonstrate how to do something. Analyze the task in advance so that you can talk through the steps and identify the

	reasons for each step. Highlight in your dialogue the decision points you made and why you made them. ● Also model alternatives about how you could have carried out the task. Do not model just one way, one strategy, one series of steps. **Culturally Responsive Instruction** (Averill et al,, 2009) ● Focus on the big ideas and important mathematics (do not just simplify or remove language.) ● Make content relevant -- help students see how mathematical ideas are interrelated. ● Put math in context (historical, cultural, etc.) ● Bring in student identities and culture. ● Share authority for learning. Students justify solutions, engage in discussions, and have choice in solving problems. **Focus on Academic Vocabulary** (Kersaint, Thompson, & Petkova, 2009; Moschkovich, 2009; Seidel & McNamee, 2005) ● Honor use of native or home language. ● Use content and language objectives. Language should develop along with mathematical goals. ● Explicitly teach vocabulary through the use of personal math dictionaries, graphic organizers, games, word walls, songs, etc. **Facilitate Engagement during Instruction** (Echevarria, Vogt, & Short, 2008; White-ford, 2009/2010; Cirillo, et al., 2014; Choppin, 2014; Maldonado, et al., 2009; Garrison, 1997; Khisty, 1997) ● Build background by using context and visuals. ● Use comprehensible input (make sure your message is understandable to students.) ○ Avoid unnecessary words and phrases. ○ Use wait time. ○ Employ visuals, manipulatives, pictures, objects, diagrams. ● Encourage discussion that reflects language needs (revoicing, pressing for details, think-pair-share.) ● Plan cooperative groups to support language.
Gap-Group Quick Reference Guides:	● **Improving Math Education for African-American Students** ● **Teaching English Language Learners** ● **Teaching Inclusive Math to Students with Disabilities** ● **Working with Economically Disadvantaged Students**