The Science of Teaching Reading and Math
Goal

- Provide participants information regarding the science of teaching reading and math—what works
Process Changes: Research

- Highly trained teachers and leaders are not enough. We need to make sure that the systems and processes are in place to support every child.
  - High performance requires every child to succeed and grow
- Clear expectations of what is to be learned at each grade level with assessments and monitoring helps ensure that we are differentiating to support each student.
Process Changes: Research

- High performing schools have high expectations for all students
- Evaluate and monitor processes to ensure processes that yield results continues
Process Changes - What? How?

- Collaborative problem solving
- Assess early
- Group by skill inventory
- Plan for transitions and sharing of data
- Early intervention
Science of Teaching Reading

- Over 90% of all students can be on grade level by end of 1\textsuperscript{st} grade
- Multi-tiered system of support works for all students when implemented well
- The gap widens each year and after 3\textsuperscript{rd} grade it takes 4 times as long to close the gap.
Science of Teaching Reading

● Reading brain – we know more about how we learn to read
● Strong understanding of what to teach
● Explicit, systematic, multi-sensory instruction is effective
The Reading Brain

It requires different areas of the brain to be activated in a coordinated and synchronised way.
Multi-Tiered System of Support

- Assessments
  - Screener – Early to identify students on and not on track
  - Skill inventories – Drill down and determine specific areas of need
  - Progress monitoring and formative data – Is the instruction working?
  - Outcomes based measures – Are students learning the core content?
  - Plus, formative data -- logs, checks, etc
ELA core instruction (Tier I) = 80%

- 90-120 minutes per day
- Standards aligned; evidence based core curriculum
- Whole and small group instruction occurs daily
- Differentiation
- Assessment
ELA core instruction (Tier I)= 80%

- Professional Development
- Phoneme Awareness, Phonics, Fluency, Vocabulary, Comprehension
High Quality Instruction

- Amount of instruction provided in reading, writing – thoroughness and intensity – Perky Pace
- Text complexity – most challenging text with scaffolds
- Quality of explanations
- Teaching materials and resources
- Data driven and skill aware
- Application of science -- such as sound walls vs word walls
Professional Development Teachers and Leaders

- Large and small group delivery
- Repetition and job-embedded practice
- 20 or more modelings and demonstrations in the classroom before teachers transfer new learning into practice
Tier II – Some Risk Identified

- Guided by Skill Inventory – Skill specific groups
- No more than 5 students per group
- MORE Explicit
- MORE Systematic
- Multi-Sensory
- 30 minutes; 3-5 days per week
- Collect formative data (logs)
Tier III – High Risk

- Guided by Skill Inventory – Skill specific groups
- No more than 3 students per group
- MORE Explicit
- MORE Systematic
- Multi-Sensory
- 30-60 minutes daily; 5 days per week
Science of Teaching: Math
Science of Teaching Math

- Teachers need a strong understanding of mathematics and how to teach it. You cannot teach what you don’t know.
Science of Teaching Math: Effective Instruction

● Use of screeners
● Use of formative assessment
● Use the science that has been thoroughly researched
● Belief that children are not ready or cannot learn a specific skill has been consistently proven incorrect.
Science of Teaching Math: Effective Instruction

- Explicit Instruction is effective in increasing student learning.
  - Provide clear models
  - Think alouds
  - Provide specific feedback (I, we, you)
Science of Teaching Math: Effective Instruction

- Opportunities for practice of new skill and previously learned facts in world based problems
- Accelerate those gifted in math
- Most textbooks are too broad in elementary school
Guiding Principles of Math Instruction

- Use research to guide instruction if it is available; if not use best professional judgement
- K-8 – should each have set of skill areas that are well-defined
- Whole #, fractions, some elements of geometry are foundational skills for Algebra; the least development foundational skill in US tends to be fractions
Guiding Principles of Math Instruction

- Automaticity of facts is necessary in order to free up working memory
- Teaching how to think mathematically vs. isolated facts
- National Advisory Panel (2008) has guidelines for each grade level
- Most students should have access to Algebra in 8th grade
Tier II

- 30-40 minutes daily
- 10 minutes daily preserved for working on automaticity of skills
- Explicit instruction: Provide think alouds and strong models
- Multi-sensory – specifically visual representations
- Small group -- no more than 5 students per group
- Correct feedback – I, We, You say
- Progress monitoring
Tier II

- Effective Interventions
  - Strategies for efficient counting (K-2)
  - Fact retrieval (automaticity)
  - Connecting symbols to visual representation
  - Whole numbers (K-5)
  - Group/collaborative problem solving
  - Analyze types of problems and provide solutions for each type of problem
Common Threads Between Reading and Math

- Assessments – Screeners, Formative, Progress monitoring, Outcomes Based measures
- Tiered Instruction works
Common Threads Between Reading and Math

- High Quality instruction matters
  - Knowledgeable teachers – requires professional development
  - Aligned resources and curriculum
  - Evaluate progress and outcomes at the student and program levels
  - Explicit – Direct, clear, models, think alouds
  - Build practice and automaticity to free up working memory
Web Links

• www.SBSL.org --- Stop by our Booth #607 to chat.
• www.TMTLAH.org --- Parent Engagement
• www.fcrr.org
• www.texasreading.org/3tier/
• www.learningfirst.org
• www.smu.edu/teacher.education/irr/index.asp
• www.readingrockets.com --- FREE Instruction Logs
• www.freereading.net
• www.EdventureZoo.com --- NEW tools for children
• Email info@SBSL.org Academic Improvement Hdqtrs