

What the Research says.....

A CLOSER LOOK AT "FLUENCY"

Computational Fluency

Refers to computation – the four operations. It is about students being able to reason about their own and other's "calculation methods" – both written and mental for the 4 arithmetic operations (NCTM;NRC 2001; Bay-Williams & SanGiovanni 2022)

Procedural Fluency

Refers to the ways in which we do things across domains of math. For example we look for procedural fluency in algebra, measurement and geometry. It is "the ability to apply procedures accurately, efficiently, and flexibly; to transfer procedures to different problems and contexts; to build or modify procedures from other procedures" and to be able to reason about the ways in which we use different strategies for different problems. (NCTM;NRC 2001)

Basic Fact Fluency

Refers to adding and subtracting within 20 and multiplying and dividing within 100.

FLUENCY IS A 3 LEGGED-STOOL!

- ACCURACY:** Correctly solving a problem and being able to explain why that problem is correct
- FLEXIBILITY:** Knowing many different ways to think about and solve a problem (Baroody & Dowker, 2003; Star, 2005).
- EFFICIENCY:** Being able to pick one of the many ways and solve the problem in a reasonable amount of time without getting bogged down, stuck or overwhelmed



(NRC; Kilpatrick et al., 2001; NCTM 2000; NCTM, 2014).

PURPOSEFUL

intentional,

meaningful practice

is at the ❤️ of learning

OUR BASIC FACTS.

At the heart of PROPER practice of mathematics is a quest for meaning. You cannot flourish in mathematics OR in life without finding meaning in YOUR endeavors.
FRANCIS SU, 2021

Practice does not mean rote experiences. Practice involves repeated experiences that give children time and opportunity to build their ideas, develop understanding, and increase fluency.
FUSON, K.C., CLEMENTS, D.H. & SARAMA, J. (2015)

There should be NO SUCH thing as BORING mathematics
-Edsger dijkstra