Companion Guide, Fractions Webinar | Kansas MTSS & Alignment

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SECTION 1: RESOURCES FOR FRACTION INSTRUCTION

1. One of the resources that helps to answer the question, "What does the research say about fractions?" is the IES Practice Guide on Fractions (Siegler, et al., 2010). How might this guide help you to teach fractions more effectively?

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2. Which two recommendations that the IES Practice Guide on Fractions provide for teachers stand out to you at this moment?

   a.

   b.

SECTION 2: COMMON ERRORS WITH FRACTIONS

1. Name two underlying misconceptions that lead to common errors with fractions made by students.

   a.

   b.

2. What is the value of promoting flexibility (versus "answer getting") in thinking about fractions and their many representations?

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3. In the webinar, Dr. Witzel discusses conceptualization and computational backgrounds as predictors of success with fractions. Below, draw a line showing which types of background knowledge are matched to specific skills.

CONCEPTUAL UNDERSTANDING	ADDING FRACTIONS
COMPUTATIONAL UNDERSTANDING	MULTIPLYING FRACTIONS

4. Why is a student's ability to understand the concept of "one" so vital to later learning?

SECTION 3: FRACTIONS RESEARCH

1. Dr. Witzel refers to research reviewed by the National Mathematics Advisory Panel. What were some of their findings?

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SECTION 4: CORE INSTRUCTION WITH FRACTIONS

1. Dr. Witzel asserts that though one might have what seems to be success early on in teaching rote procedures for converting mixed fractions to improper fractions (i.e., a quick trick), it may lead to misunderstanding later. Why is it vital to connect procedures to concepts when teaching fractions (see improper fraction conversion below)?

Rote Procedure/Quick Trick:	Concept Tied to Procedure:
4 2/5	4 2/5
5X4=20	4/1 + 2/5 =
20+2=22	20/5 + 2/5=
22/5	22/5

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2. Mathematics is a series of compressed skills and properties culminating in Algebra. Dr. Witzel highlights the importance of teaching basic fraction properties and computation skills conceptually. In the problem shown near 28:05, which compressed concepts are present in this one algebra problem?

3. Mathematics is complex, and Concrete, Visual & Abstract (CVA) Representations will help students to understand. How are the following length-based concrete models helpful in conveying conceptual understanding?

Length-Based Concrete Representation	Why is it helpful?
Cuisenaire Rod	
Number Line	
Fraction Strips	
Twizzlers	
Walking / Masking Tape	

SECTION 5: FRACTIONS AS A PREDICTOR

1. A student's understanding of fractions is highly predictive of future success in algebra. How do fraction skills progress from grade to grade across the standards?

2. What misconceptions are typically found at specific grade-levels, and how can educators address these misconceptions?

SECTION 6: DEVELOP FRACTION MAGNITUDES

1. How does shifting language from “times” to “of” help students better conceptualize multiplying fractions? For example, instead of saying “What is 2/3 **times** 1/2?” say, “What is 2/3 **of** 1/2?”

SECTION 7: COMPUTATIONAL PROFICIENCY FOR FRACTIONS

1. What are the stages of computational proficiency development?

    a. Understanding _____

    b. _____ use of strategies

    c. Recall / _____ of facts

2. Recent research has shown that students have what Dr. Schiller calls, *percentage bias*, meaning that when given two points on the number line in the form of a percentage, decimal, or fraction, they are biased in thinking the percentage is larger. How might this bias transfer into a student’s ability to estimate later on?

SECTION 8: INTERVENTIONS

1. Which intervention strategies were shared were most helpful for you and your struggling students?