

Professional Development Module

Title: Teaching Fractions in Grades 3 - 6

Content and Instructional Shifts: K-5

Targeted Audience: Teachers in grades 3-6

Grade Span: 3-6

Description: Instructor notes; handouts; implementation assignments – based on *Extending Children's Mathematics: Fractions and Decimals* by Empson and Levi

Delivery time: Session 10 of 10 three-hour sessions

The following materials were designed with the intent that the presenter(s) would be educators who have a deep understanding of the mathematical content being addressed at this level.

Session 10 Instructor Notes:

Learning Goals:

- Teachers will understand the content and instructional shifts for teaching fractions resulting from adoption of *Iowa Core Mathematics*.
- Teachers will understand the grade-specific expectations and cross grade-level learning progressions of the *Iowa Core Mathematics* fraction standards.
- Teachers will understand and implement research-based instructional strategies to build students' understanding of fractions and algebra.

Success Criteria:

- Teachers will develop a plan for teaching Iowa Core Mathematics fraction standards.

Time: 3 hours

Materials:

- Book *Extending Children's Mathematics: Fractions and Decimals* by Empson and Levi
- Handout "Iowa Core Mathematics Fraction Standards"
- Handout "Progressions for the Common Core State Standards in Mathematics (draft). Number and Operations—Fractions, 3–5"
- Instructor Resource "Front Matter for Progressions for the Common Core State Standards in Mathematics (draft)"
- Handout "Planning for the Year"
- Textbook and resources used by each participant to teach fractions

Session 10 Activity 1
Discuss the Fraction Progressions Document

Approximate Time: 20 minutes

Key Purpose: To highlight learning from the Progressions document for fractions.

Materials:

- Handout “Progressions for the Common Core State Standards in Mathematics (draft). Number and Operations—Fractions, 3–5”
- Instructor Resource “Front Matter for Progressions for the Common Core State Standards in Mathematics (draft)”

Activity Description	Key Discussion Points
<p>Discuss the Fraction Progressions Document</p> <p>The homework assignment for Session 10 was to read “Progressions for the Common Core State Standards in Mathematics (draft) Number and Operations—Fractions, 3–5” (handout). Place participants in small groups to discuss the ideas they found most important and any questions they might have. Have each group share highlights of their discussion with the entire class.</p>	<p>Discuss the Fraction Progressions Document</p> <p>Participants should see many connections between the content of the Progressions document and the content of this class. The discussion provides a time to review key ideas and more deeply understand the intent and progression of the fraction standards.</p>

Session 10 Activity 2
Analyze Textbook Unit(s) on Fractions

Approximate Time: 60 minutes

Key Purpose: To decide how to use current textbook lessons for teaching fractions.

Materials:

- Textbook/resources used by each participant
- Handout “Iowa Core Mathematics Fraction Standards”
- Handout “Planning for the Year”

Activity Description	Key Discussion Points
<p>Analyze Textbook Unit(s) on Fractions</p> <p>Have participants read the directions on page 1 of “Planning for the Year” (handout). Briefly discuss the type of lessons teacher may choose to use as intended, the lessons teachers may choose to omit, and the lessons teachers may choose to change. Provide teachers approximately one hour to review their current textbook lessons and complete the table. Provide the handout electronically, so participants can adjust the number of rows to fit their textbook unit(s).</p>	<p>Analyze Textbook Unit(s) on Fractions</p> <p>The purpose of this activity to look at the resources they have available with a critical lens based on the knowledge they acquired through this class.</p> <p>Teachers may currently use a variety of resources for teaching fractions and may have varying degrees of freedom when supplementing district approved resources. Examples of typical resources include:</p> <ul style="list-style-type: none"> • Textbooks published before <i>Common Core State Standards for</i>

- Mathematics* and not aligned to the content standards.
- New textbooks with a traditional approach. These texts tend to be aligned to the content standards, but focus on learning procedures rather understanding concepts.
 - New textbooks with a reformed approach. These texts tend to be aligned to the content standards and focus on understanding.
 - Online modules such as EngageNY. Online resources also vary in approach.
 - A blend of many resources.
- Assist teachers as they identify strengths and weaknesses of their current resources and work under the given constraints of their district.

Session 10 Activity 3
Create a Plan for Teaching Fractions with Understanding

Approximate Time: 100 minutes

Key Purpose: To create a plan for teaching fractions using research-based instructional strategies.

Materials:

- Book *Extending Children’s Mathematics: Fractions and Decimals* by Empson and Levi
- Handout “Iowa Core Mathematics Fraction Standards”
- Handout “Planning for the Year”

Activity Description	Key Discussion Points
<p>1. Create a Yearly Plan</p> <p>Place participants in grade-alike groups. Have participants read the directions on page 2 of “Planning for the Year” (handout). Again, provide this document electronically, so participants can adjust the tables to fit their needs. Briefly discuss the following questions:</p> <ul style="list-style-type: none"> • What experiences do your students need to develop a robust understanding of fractions? • How will you address the missing pieces? • Do you need to add content to your fraction unit? • Do you need to pose problems before starting the fraction unit to prepare students for the unit? <p>Remind participants of the sample problems and guidelines in <i>Extending Children’s Mathematics</i>. Encourage participants to work as a grade-alike team. Also encourage participant to share resources,</p>	<p>1. Create a Yearly Plan</p> <p>The goal is for teachers to leave this session with a plan for implementation and a bank of problems. Third and fourth grade teachers may want to give their students multiple opportunities to develop understanding of fractions and fraction equivalence over time. Fifth and sixth grade teachers may want a plan to develop understanding of fractions before students focus on fraction computation later in the year. Both groups will want a progression of Equal Sharing and Multiple Groups problems.</p> <p>Due to the nature of this activity and the needs of individual teachers the end product may look different. Participants will not have time to complete the work during this session.</p>

<p>especially problems they create.</p>	<p>Be available for questions as participants work. Also offer to help participants find additional resources and write problems with number choices to fit a given purpose.</p>
<p>2. Share Plans Have each participant or team of participants share their plans for implementation.</p>	<p>2. Share Plans Sharing at the end of the class creates accountability for participants' work time and provides insight into additional support teachers may need.</p>