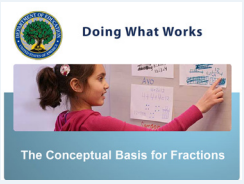
DOINGWHATWORKS

PRESENTATION
4:45 min

Full Details and Transcript



The Conceptual Basis for Fractions

May 2011

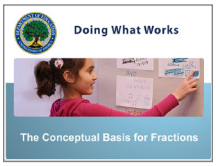
Topic DEVELOPING EFFECTIVE FRACTIONS INSTRUCTION FOR K-8

Practice INITIAL FRACTION CONCEPTS

Highlights

- Students are never too young to practice working with the fundamental ideas underlying fractions.
- Teachers in the primary grades can build on children's informal understanding to develop fraction concepts.
- Begin with activities that involve dividing groups of objects equally.
- Then introduce the new challenge of unit fractions, involving partitioning of a single object among sharers so that each receives equal shares.
- During such activities, teachers can use fraction names and help children compare fractional parts.
- Teachers can also build on children's informal understandings of proportional relationships to lay the foundation for more advanced concepts of ratio and proportion in the upper elementary grades.
- Learning is effective when it builds on children's existing knowledge, making connections to what children already understand in real-world contexts.

Full Transcript



Slide 1: Welcome

Welcome to the overview on The Conceptual Basis for Fractions.

Slide 2: Informal concepts

Students are never too young to practice working with the fundamental ideas underlying fractions.

These students in Mrs. Malik's first-grade class won't be formally working with fractions for a few years, but they're dealing with ideas about fractions all the time.

Slide 3: Building on informal understanding

Young children come to school with an informal understanding of sharing and proportionality. Teachers in the primary grades can build on that informal understanding to develop fraction concepts.

Here's how Mrs. Malik is challenging her first-grade students to use what they already know to develop fraction concepts.

Slide 4: Equal sharing

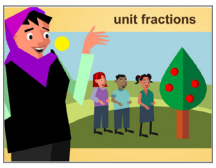
One activity involves dividing groups of objects equally.

She says to her students, "Four friends have 12 pretzels. They want to share, but each of them needs to get the exact number of pretzels. How many pretzels should each person get?"

To figure out the answer, some children draw pictures; others count out pretzels one by one. Regardless of how they work out the answer, they are dividing 12 objects into four equal shares.

Slide 5: Changes in sets

Mrs. Malik changes the problem to require different partitioning: “Two more of their friends come over. They want some of the pretzels too. How many pretzels does each person get now?”



Slide 6: Partitioning objects

Once Mrs. Malik’s students show that they are comfortable with dividing sets equally, she introduces the new challenge of unit fractions.

She poses a problem that requires the partitioning of a single object: “What if there is only one apple and three children want to share it? How much should each get?”

The problems get gradually more complex: “What about three children and four apples?”

While working through problems like these, Mrs. Malik begins to introduce fraction names, such as *one-third*.

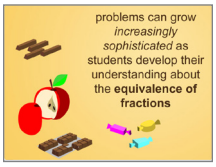
Slide 7: Comparing fractions

Similar problems can help young students compare fractions.

Students can be asked to try different ways to partition objects so that each receives equal shares.

Here, one student breaks both candy bars in half while another breaks each into four pieces and groups two pieces together for each child.

Children can check to see that each approach results in equivalent shares.



Slide 8: Equivalent fractions

There are many variations on this kind of problem, and they can grow increasingly sophisticated as students develop their understanding about the equivalence of fractions.

"If four children in one group share six apples, how many apples do they each get? If six children want the same amount of apples as the first group, how many apples will they need to share?"

These exercises encourage students to explore the concept of equal partitioning by using different approaches.

Slide 9: Ordering fractions

During such activities, teachers can use fraction names and help children compare fractional parts.

"Is one-third of an apple larger or smaller than one-fourth of the same apple?

Slide 10: Proportional relationships

In addition to working with students on sharing and dividing, researchers and mathematics educators suggest that teachers build on children's informal understandings of proportional relationships. This will lay the foundation for learning more advanced concepts of ratio and proportion in the upper elementary grades.

Slide 11: Relationships

Early proportional thinking can develop as teachers point out relationships between objects that occur in children's stories, such as relationships based on size and pattern.

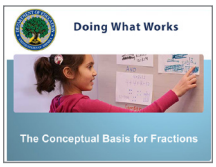
Or, help children prepare recipe mixtures that involve relationships among quantities.

Or, show examples of how objects vary together—in size or length, for example.

Slide 12: Concept development

Learning is effective when it builds on children's existing knowledge, making connections to what they already understand in real-world contexts.

Given the difficulty that many older children experience with rational numbers, it is especially important to start early to build the mathematical thinking associated with fractions.



Slide 13: Learn more

To learn more about The Conceptual Basis for Fractions, please explore the additional resources on the Doing What Works website.