FRACTIONS

# NEWLY RELEASED

## Classroom ready research-affirmed tasks and activities for Fractions learning

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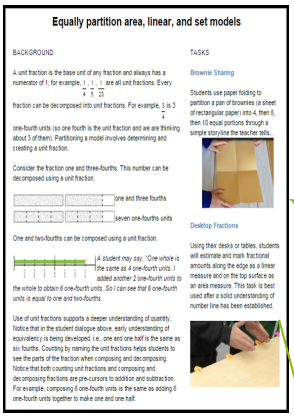

Equally partition area, linear, and set models

BACKGROUND

A unit fraction is the base unit of any fraction and always has a numerator of 1; for example, 1/4, 1/7, 1/23 are all unit fractions. Every fraction can be decomposed into unit fractions. For example, 3 is 3 1/4.

one-fourth units (so one fourth is the unit fraction and we are thinking about 3 of them). Partitioning a model involves determining and creating a unit fraction.

Consider the fraction one and three-fourths. This number can be decomposed using a unit fraction.

one and three fourths

seven one-fourths units

One and two-fourths can be composed using a unit fraction.

A student may say, "One whole is the same as 4 one-fourth units. I added another 2 one-fourth units to the whole to obtain 6 one-fourth units. So I can see that 6 one-fourth units is equal to one and two-fourths.

Use of unit fractions supports a deeper understanding of quantity. Notice that in the student dialogue above, early understanding of equivalency is being developed, i.e., one and one half is the same as six fourths. Counting by naming the unit fractions helps students to see the parts of the fraction when composing and decomposing. Notice that both counting unit fractions and composing and decomposing fractions are pre-cursors to addition and subtraction. For example, composing 6 one-fourth units is the same as adding 6 one-fourth units together to make one and one half.

TASKS

Brownie Sharing

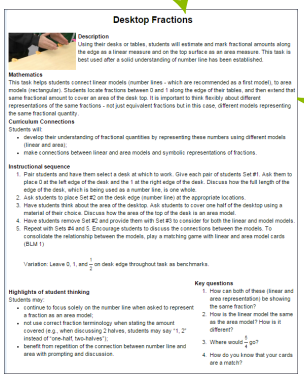
Students use paper folding to partition a pan of brownies (a sheet of rectangular paper) into 4, then 8, then 10 equal portions through a simple storyline the teacher tells.

Desktop Fractions

Using their desks or tables, students will estimate and mark fractional amounts along the edge as a linear measure and on the top surface as an area measure. This task is best used after a solid understanding of number line has been established.

Select a cell to view background information and tasks.

Select a task.


Desktop Fractions

Description
Using their desks or tables, students will estimate and mark fractional amounts along the edge as a linear measure and on the top surface as an area measure. This task is best used after a solid understanding of number line has been established.

Mathematics
This task helps students connect linear models (number lines - which are recommended as a first model), to area models (rectangular). Students locate fractions between 0 and 1 along the edge of their tables, and then extend that same fractional amount to cover an area of the desk top. It is important to think flexibly about different representations of the same fractions - not just equivalent fractions but in this case, different models representing the same fractional quantity.

Curriculum Connections
Students will:
- develop their understanding of fractional quantities by representing these numbers using different models (linear and area);
- make connections between linear and area models and symbolic representations of fractions.

Instructional sequence
1. Pair students and have them select a desk at which to work. Give each pair of students Set #1. Ask them to place 0 at the left edge of the desk and the 1 at the right edge of the desk. Discuss how the full length of the edge of the desk, which is being used as a number line, is one whole.
2. Ask students to place Set #2 on the desk edge (number line) at the appropriate locations.
3. Have students think about the area of the desktop. Ask students to cover one half of the desktop using a material of their choice. Discuss how the area of the top of the desk is an area model.
4. Have students remove Set #2 and provide them with Set #3 to consider for both the linear and model models.
5. Repeat with Sets #4 and 5. Encourage students to discuss the connections between the models. To consolidate the relationship between the models, play a matching game with linear and area model cards (BLM 1)

Variation: Leave 0, 1, and $\frac{1}{2}$ on desk edge throughout task as benchmarks.

Highlights of student thinking
Students may:
- continue to focus solely on the number line when asked to represent a fraction as an area model;
- not use correct fraction terminology, when stating the amount covered (e.g., when discussing 2 halves, students may say "1, 2" instead of "one-half, two-halves");
- benefit from repetition of the connection between number line and area with prompting and discussion.

Key questions
1. How can both of these (linear and area representation) be showing the same fraction?
2. How is the linear model the same as the area model? How is it different?
3. Where would $\frac{5}{4}$ go?
4. How do you know that your cards are a match?

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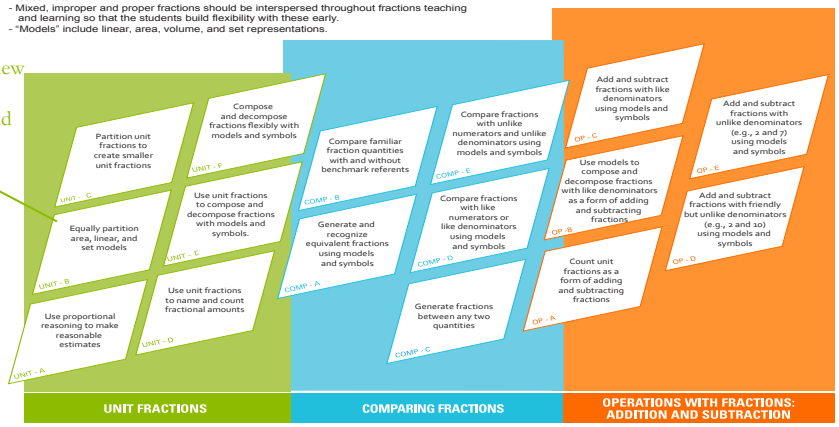
## Fractions Learning Pathways

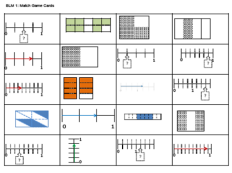
Please Note:
- Mixed, improper and proper fractions should be interspersed throughout fractions teaching and learning so that the students build flexibility with these early.
- "Models" include linear, area, volume, and set representations.

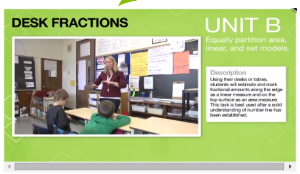



Created by Dr. Cathy Bruce, Tara Flynn and Shelley Yearley.
Fractions Learning Pathways are inspired by Dr. Jere Confrey's work, based on international and Ontario classroom research, and informed by feedback from classroom teachers and student thinking.

Additional materials added regularly

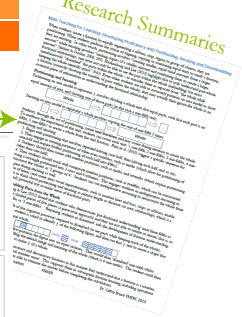
Coming Soon
*Operations with Fractions: Multiplication and Division*


Blackline Masters

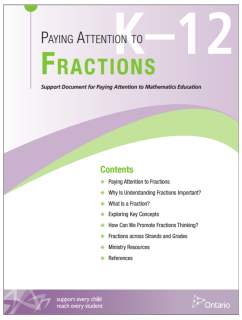


Visuals of Implementation

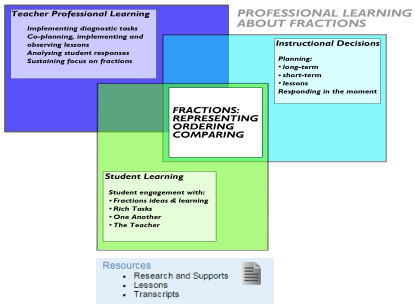

Student Thinking Unpacked


Research Summaries

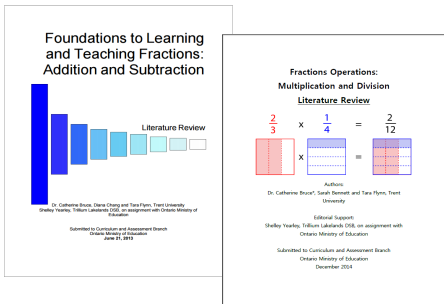
# MORE FRACTIONS RESOURCES AVAILABLE




**Paying Attention to K-12 Fractions**
Deepen your understanding of fractions.
Try some of the tasks with your students.




**Digital Paper: Professional Learning about Fractions**
Visit the resources section for lessons and lesson bundles.
View the videos to understand the journey and the learning.




**Literature Reviews**
Broaden your understanding of the research.
Learn about international teaching practices.

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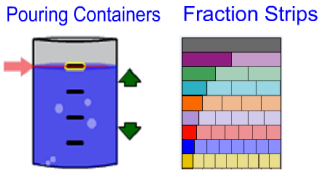
**Learning Tools**
for whole class, small group or individual exploration

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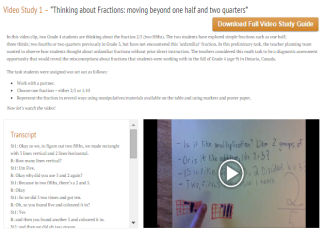
Free resources generated from collaborative action research in Ontario schools.

Research funding and partnerships: Trent University, KNAER, Ontario Ministry of Education, SSHRC, Ontario School Boards.

**Video Studies**
for professional learning

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