Question the Image Fraction Activity

Are the fraction images students are presented with supporting their learning or impeding their understanding?

This professional learning activity is meant to engage adults in conversation around the images used to teach and engage students in their fraction units of study.

Directions:

- Project or print a subset or all of the images provided for participants.
- Pose the question above and ask participants to engage in a think-pair-share.
    - Think: Independently consider your own answer to the question for each of the images.
    - Pair: With a partner or small group, engage in a conversation about the focus question in relation to the images.
    - Share: Whole-group discussion centered on the focus question.
- Additional questions:
    - What are the problematic aspects of the images?
    - Are there images like these in our instructional materials? How do we discuss them with students?
    - What are some ways to support students with fraction representations in daily lessons?

Image 1:

Image 2:

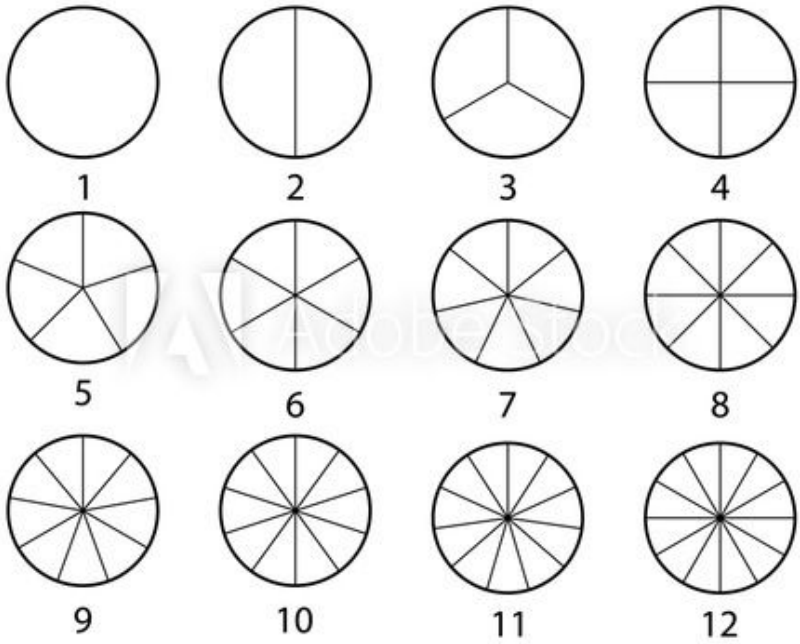

Image 3:

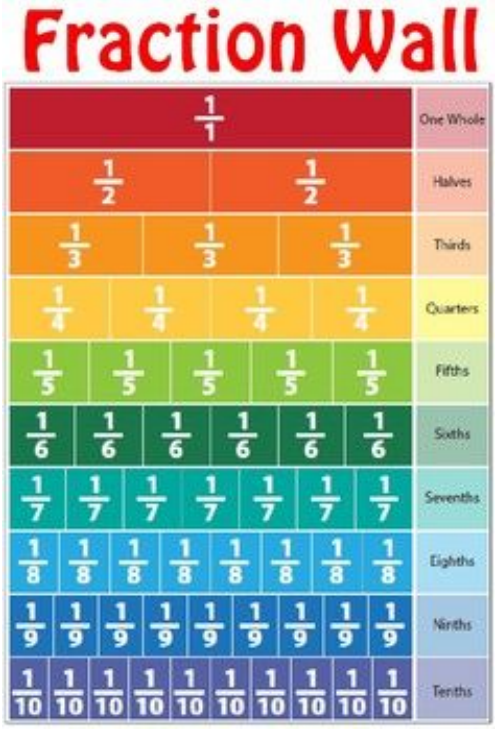

Image 4:

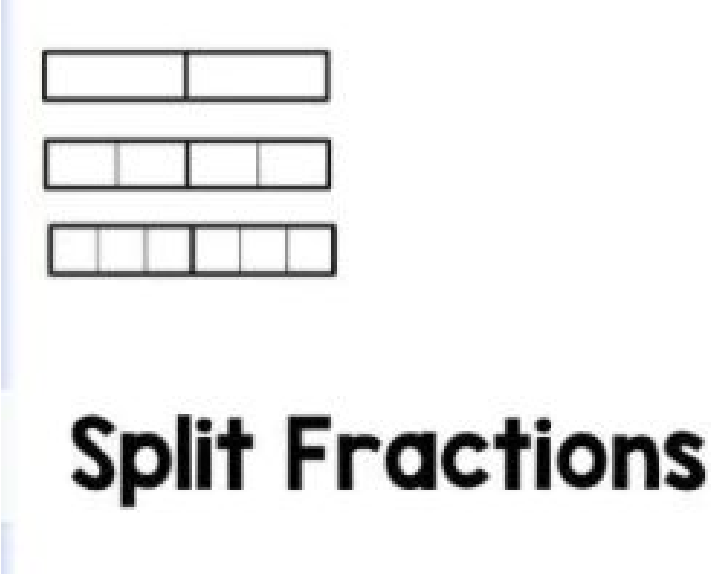

Image 5:

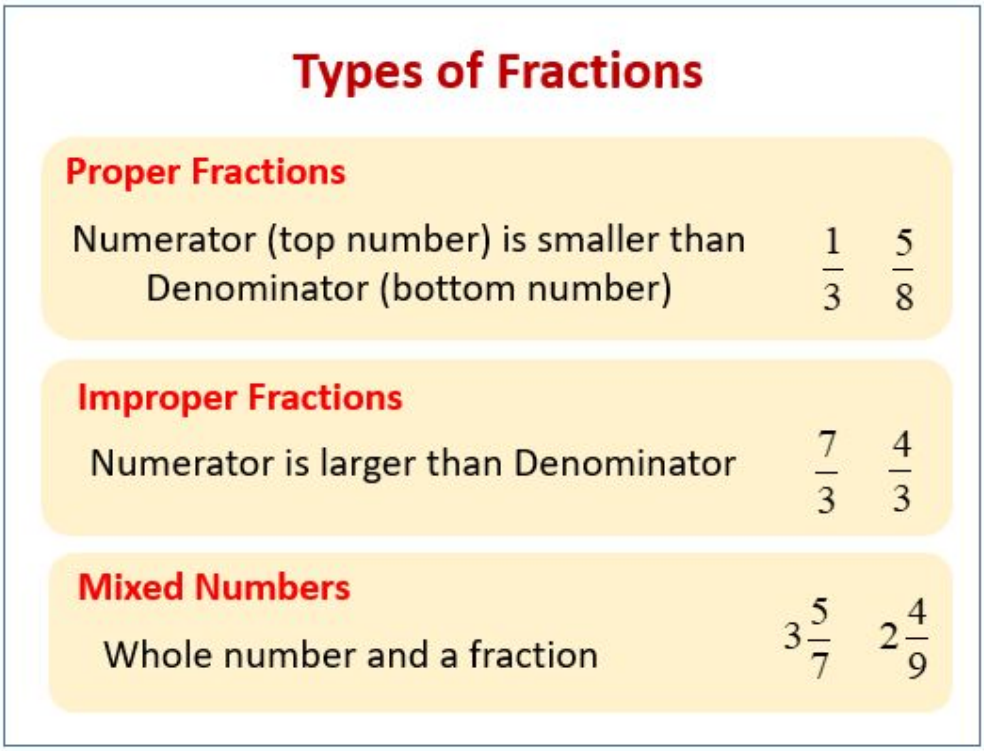

Image 6:

Image 7:

Discussion Points

Image	Things to Consider
1	Since numbers increase in magnitude from left to right on a number line, this image may be confusing to students because the magnitude of the shown numbers, from left to right, is decreasing. This presentation could lead to an assumption that ½ is larger than 1 and ¼ is larger than ½, and so on.
2	Labeling each whole circle by a whole number of pieces rather than attending to the unit 1 and the number of pieces of 1 as drawn is simply confusing. Each image marked correctly as halves, thirds, fourths, etc., would help students understand that 1 is partitioned into smaller pieces, and the more pieces, the smaller the unit fraction.
3	Tracing directly down from 1/1, students see the unit fractions of 1/3, 1/5, 1/7, and 1/9 in a column, yet these fractions are not equivalent. It is important for students to understand where the tick mark or end point of a fraction would be. 1/1 would be at the end of the tape diagram; 4/8 would be at the half mark, and 8/8 would be in line with 1.
4	Using words like "split" and "double" when showing and discussing equivalent fractions contributes to misunderstanding about the size of fractions.
5	When the word "number" is used in a definition of numerator and denominator, it can lead students to think that fractions are a combination of two numbers instead of a number themselves. Additionally, the term "improper fraction" is misleading, and it would be better to call these "fractions greater than one."
6	When students engage in activities that involve "new rules" to make the game true or possible, it can be confusing to them. The numbers 5 and 6 are whole numbers, but the graphic gives the appearance that since 5 pieces are shaded out of 6, the whole number cubes represent one fraction of 5/6. Additionally, what happens in an activity like the one depicted when the cubes create a number greater than 1?
7	Teaching and displaying a trick diminishes understanding and developing fraction concepts. When students understand fractions greater than one, they can describe and show 11/3 as 3/3 + 3/3 + 3/3 + 2/3 or 3 ⅔ instead of using a division algorithm.