The measurement interpretation encompasses a fairly wide range of skills and understandings that students need to develop. One of these is the ability to determine relative magnitudes of rational number values regardless of form. Having students place rational numbers on number lines with different sets of benchmark values, some more helpful than others, is an excellent way to see students’ thinking about relative magnitudes and equipartitioning. If a student is given a number line that is partitioned into fourths and is asked to plot , that would likely be easier than if they were provided with one that was split into eighths or halves or not split between zero and one at all. Even more difficult would be a number line divided into fifths, as students could not use halving strategies in the same way as with the other examples. Furthermore, older students may be able to place fraction, decimal, and percentage values on the same number line or to directly compare the magnitudes of these values using symbolic notation . Making use of combinations of these three representational forms can not only reveal any misconceptions that students have but can also help students further develop conceptual connections between them, which strengthens their ability to make use of the underlying structures.

During this activity, the teacher will want to watch for the strategies that students use to place values on a number line or to compare values. If a student always resorts to finding a decimal equivalent when comparing values, for example, they may not have a fully developed understanding of equivalent fractions, or they may have trouble with the fair sharing idea that more pieces of the same whole result in smaller pieces. A student who understands these concepts should be able to compare and by either creating two new fractions with common denominators or by reasoning that , which means that is much closer to 1, as it is missing only one piece compared to three pieces, and that the missing piece is smaller than each of the three missing pieces in . Similarly, difficulty placing a value greater than one on a number line may reveal troubles viewing fractions as iterators that can be applied as many times as needed to obtain a given value (e.g., iterating seven times will result in ).

Teachers may also check students’ understandings of iteration using other formative assessment activities such as that described by Simon and colleagues (2018). They discussed a task in which a student is given a unit bar made of four pieces and additional materials and is asked to create a bar that is of a unit. A student in this situation may then create the new bar by adding three more units of the same size as the original four to the bar they were given. If students respond that you cannot have more than four pieces, then they are likely misunderstanding that unit fractions may be iterated to create new fractions of various sizes, including values larger than one. Another option is to go in the other direction by asking students to measure a longer bar with a smaller one. In their task, a carpenter needs to get a beam that is the same size as one her already has. He plans to measure the longer beam with a shorter one that he has available, and it turns out that seven of the shorter beams fit into the longer one. This length is then used to find the lengths of other beams of various sizes. Using manipulatives or drawings to construct a composite value through iteration in this way allows students to practice “us[ing] appropriate tools strategically” (Common Core State Standards Initiative, 2010, p. 7).