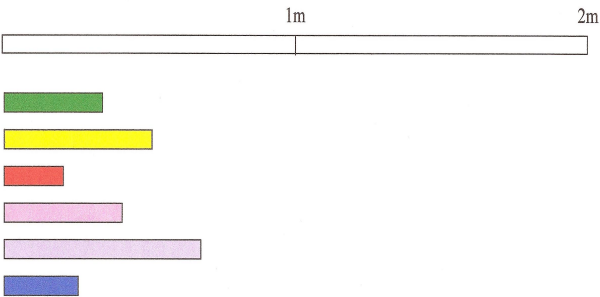


## Summary of Video Excerpts (Lesson Series 1): Introduction to Fractions in a Linear Measurement Context

<p><i>Not included</i></p>	<p>[Warm up lesson so Dr. Takahashi (Dr. T.) gets to know the students]</p>	<p>[<i>Displaying the dates</i>: How many number cards do we need to display all the dates (1 through 31) on the classroom wall?]</p>
<p><b>FRACTIONS LESSON 1</b> Video: trt 14 min. 11 sec.</p>	<p><b>How Can We Express Fractional Parts (Unit Fractions)?</b> Based on <i>Mathematics for Elementary School 3B</i> (Hironaka et al., 2006) pp. 57-58.</p> <p><b>Goal:</b> Students will become aware of fractions in everyday life and will understand that fractions are used to express an amount obtained as a result of equal partitioning and can be used to express quantities less than 1 (Lesson 1 uses only unit fractions).</p>	<p><i>Expressing unit fractions</i> Students are asked what numbers on a trail sign represent. “North Shore TR 3” (what does the 3 mean?) and “Lake Front <math>\frac{1}{4}</math>” (what does <math>\frac{1}{4}</math> mean?). The class discussion distinguishes whole numbers from fractional parts.</p> <p>Dr. T. shows the students a 2-meter tape strip that represents the length around a tree trunk and asks students to express this length in meters. He then shows a tape strip that is a bit longer than 1 meter. He asks: How can we express the bit longer (the fractional part left over from measuring with the meter) using the 1-meter tape strip as a reference?</p> <p>Students are given a 1-meter paper tape strip and a strip of green card the same length as the fractional part. Students discover the green strip fits into 1 meter exactly 3 times and is therefore <math>\frac{1}{3}</math> meter. Dr. T. hands out a second, yellow piece of card (a different fractional length) and asks students to express its length using the 1-meter tape strip as a reference. Students discover it fits exactly 2 times and is therefore <math>\frac{1}{2}</math> meter. Students are asked to predict the length of a third, red card piece, and they discover it fits into the 1 meter exactly 5 times, and is therefore <math>\frac{1}{5}</math> meter. Throughout the lesson, Dr. T. encourages students to measure carefully using the card pieces and to use meters to express the length of the fractional part (“one third <i>what?</i>” and “one fifth <i>what?</i>”).</p>
<p><b>FRACTIONS LESSON 2</b> Video: trt 17 min. 45 sec.</p>	<p><b>How Can We Express Fractional Parts (Non-unit Fractions)?</b> Based on <i>Mathematics for Elementary School 3B</i> (Hironaka H. et al., 2006) pp.58-59.</p>	<p>Dr. T. shows examples of student journals from the prior day. He highlights the different ways students expressed one-third meter: <math>\frac{1}{3}</math> of a meter, one third of a meter, one third meter, <math>\frac{1}{3} m</math>, <math>\frac{1}{3}</math> meter. In response to a question one student wrote in her journal “how many <math>\frac{1}{5}</math> would it take to make <math>7m</math>?” Dr. T. has made a <math>7m</math> strip of tape and asks students to think about the answer.</p>



	<p><b>Goal:</b> Students will understand that a fraction can be considered as a collection of unit fractions.</p>	<p>Students are again asked to express the length of a mystery length tape strip using 1 meter as a reference. Each group receives the mystery length tape strip (<math>\frac{2}{5}m</math>) and a 1-meter tape strip.</p> <p>One group of students uses the chart (summary of the lesson) from the previous day to discover that the <math>\frac{2}{5}m</math> strip is twice the (red) <math>\frac{1}{5}m</math> strip and therefore <math>\frac{2}{5}m</math>. Another group becomes confused when the mystery strip goes into 1 meter two and a half times and calls it both <math>\frac{2}{5}m</math> and <math>\frac{2}{3}m</math>. Class discussion explores why <math>\frac{2}{5}m</math> does not go into <math>1m</math> an even number of times.</p> <p>A second mystery length tape strip (<math>\frac{2}{3}m</math>) is investigated; once again, groups use several methods, including measuring with the <math>\frac{1}{3}m</math> strip and folding the mystery strip so that it fits an even number of times.</p>
<p><b>FRACTIONS LESSON 3</b> Video: trt 23 min. Day 4 (cont.)</p>	<p><b>Fraction Size</b> <i>Mathematics for Elementary School 3B</i> (Hironaka H. et al., 2006) pp.60.</p> <p><b>Goal:</b> Students will learn fraction notation.</p> <p>Students will become aware that a fraction can be put on a number line.</p>	<p>The lesson again begins with review of selected student journals to revisit the prior day's learning. The whiteboard display and a sheet inside the students' math journals (see below) show the size of the various fractional parts investigated during days 2 and 3 in relation to each other and to the 2-meter strip.</p>  <p>Students investigate another mystery piece using the 1-meter tape strip as a reference; students discover it is <math>\frac{1}{4}m</math> by different methods including iterating the card piece exactly 4 times and folding the 1-meter tape strip into four equal parts.</p> <p>Students are asked to make a <math>\frac{3}{4}m</math> tape strip from a tape strip of unclear length (slightly less than a meter, with a torn end). Students use different methods to create <math>\frac{3}{4}m</math> (folding the mystery strip in fourths or using known lengths to measure), resulting in different length strips. Through discussion, the students realize that one group found <math>\frac{3}{4}m</math> whereas the other group found <math>\frac{3}{4}</math> of the original tape.</p>



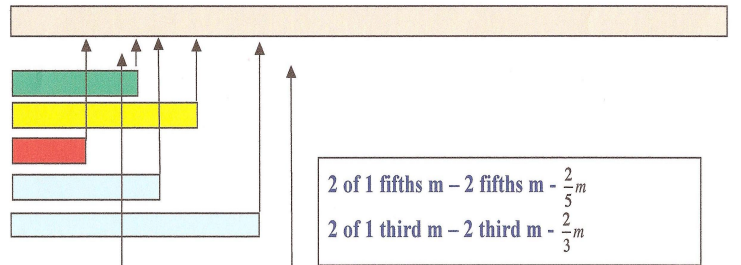
Fraction notation is formally introduced using a sign from the classroom:

- 3 numerator
- 4 denominator

Groups create a mystery fraction strip of their choice (using the color cards - green, yellow, red and blue), keeping the length secret so that other groups can guess it.

We have done so far.....

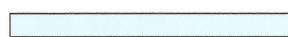
$\frac{1}{5}m$     $\frac{1}{3}m$     $\frac{2}{5}m$     $\frac{1}{2}m$     $\frac{2}{3}m$    1 m   2 m



How long is this blue strip?



Can you make three fourths meter?



Chose one of the color strips and express a fraction by using a tape strip.

How many  $\frac{1}{5}$  would it take to make 7 meters?

Numbers like  $\frac{3}{4}$  called fractions.

4 is called denominator to express the unit, fourth.

3 is called numerator to express how many of the unit.

