

Table 4: Fractions Units in Japanese Elementary Curriculum (Hironaka & Sugiyama, 2006)

Grade level	Unit name	# of periods	Instructional contents
3	Fractions	8	<ul style="list-style-type: none"> ◎ Meaning of fractions and how to express them [fractions, denominator, numerator, 1/10's place] ○ Simple addition and subtraction of fractions
4	Fractions	11	<ul style="list-style-type: none"> ◎ Concepts and structures of proper fractions, mixed numbers and improper fractions [proper fraction, mixed number, improper fraction] ○ How to show fractions on a number line, comparison of the size of fractions ○ Converting mixed numbers to improper fractions and vice-versa ◎ Relationship of equivalent fractions ◎ Addition and subtraction calculation of proper fractions with like denominators ○ Addition and subtraction calculation of mixed numbers with like denominators
5	Addition and Subtraction of fractions	12	<ul style="list-style-type: none"> ◎ Meaning of simplifying a fraction and finding a common denominator and how to find them [simplifying a fraction, finding a common denominator] ◎ Addition and subtraction calculation of fractions with different denominators
5	Fractions and Decimal numbers	6	<ul style="list-style-type: none"> ◎ The quotient of the division of whole numbers can be expressed as a fraction ○ Interrelationships between fractions, decimal numbers, and whole numbers
6	Multiplication and Division of Fractions	3	<ul style="list-style-type: none"> ◎ Meaning of a fraction multiplied by a whole number and its method of calculation ◎ Meaning of a fraction divided by a whole number and its method of calculation
6	Multiplication of Fractions	11	<ul style="list-style-type: none"> ◎ Meaning of multiplying by a fraction and its method of calculation ○ A product becomes smaller than multiplicand when the multiplicand is multiplied by a proper fraction (<1). ◎ Meaning of decimal calculation involving the second relationship of ratio ($A = B \times p$). If B is the base quantity, A is the quantity to be compared, and p is the value of ratio. The quantity to be compared can be found by the base quantity multiplied by how many times as much as decimal number.) ○ In the case of fraction calculation, a calculation operation similar to whole numbers can be done
6	Division of Fractions	13	<ul style="list-style-type: none"> ◎ Meaning of dividing by a fraction and its method of calculation ○ A quotient becomes larger than dividend when the dividend is divided by a proper fraction (<1). ○ Meaning of decimal calculation involving the first relationship of ratio ($p = A \div B$) and the third relationship of ratio ($B = A \div p$). ◎ Meaning of reciprocals and how to find them [reciprocals] ○ How to carry out mixed calculations of fractions and decimal numbers
6	*What Calculations Are We Going to Do?	(1)	<ul style="list-style-type: none"> ○ Decision making on use of calculation operations, multiplication or division, involving fractions
◎	Indicates Important Content	*	Periods teachers can adjust by considering the students' state of learning
[]	Mathematical terms and symbols learned in the unit	()	Number of available periods in the month