Grade 3 - Unit 4F - Fractions

Unit Focus

In this unit, students begin by building, comparing, and investigating relationships between unit and common fractions using several models including parts of a whole and number line models. The number line model is further developed to understand fractions greater than a whole and representing whole numbers as fractions, i.e. 3 = 3/1. Using models, students explore comparing fractions with like denominators or like numerators and begin building an understanding of equivalent fractions. Students then learn how to measure to the nearest 1/2 and 1/4 inch on a ruler and create line plots using measurement data.

Stage 1: Desired Results - Key Understandings

Standard(s)

Standards

- Common Core
  - *Mathematics: 3*
    - Develop understanding of fractions as numbers.
    - Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b. *(CCSS.MATH.CONTENT.3.NF.A.1)*
    - Understand a fraction as a number on the number line; represent fractions on a number line diagram. *(CCSS.MATH.CONTENT.3.NF.A.2)*
    - Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line. *(CCSS.MATH.CONTENT.3.NF.A.2A)*
    - Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line. *(CCSS.MATH.CONTENT.3.NF.A.2B)*
    - Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. *(CCSS.MATH.CONTENT.3.NF.A.3)*
    - Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. *(CCSS.MATH.CONTENT.3.NF.A.3A)*
    - Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model. *(CCSS.MATH.CONTENT.3.NF.A.3B)*
    - Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram. *(CCSS.MATH.CONTENT.3.NF.A.3C)*

Transfer

Students will be able to independently use their learning to...

T1 Represent situations using mathematical reasoning and symbols.
T2 Apply models to solve problems.
T3 Construct viable arguments using clear and appropriate mathematical language and critique the reasoning of others.

Meaning

Understanding(s)	Essential Question(s)
Students will understand that... **U1** Mathematicians make sense of quantities to represent situations mathematically. **U2** Mathematicians construct viable arguments to explain problems, solutions, and mathematical representations. **U3** Mathematicians create or use models to generalize, represent, and solve problems.	*Students will keep considering...* **Q1** How can the relationship between quantities be represented? **Q2** What do the quantities mean? **Q3** What model best represents this problem? **Q4** Have I sufficiently supported my answer and shown my work? **Q5** How can I strengthen my argument and reasoning?

Acquisition of Knowledge and Skill

Knowledge	Skill(s)
Students will know... **K1** the symbolic notation for a given fraction	*Students will be skilled at...* **S1** partitioning shapes into parts with equal areas and expressing the area of each equal

Stage 1: Desired Results - Key Understandings

▪ Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. *(CCSS.MATH.CONTENT.3.NF.A.3D)* ▪ Represent and interpret data. ▪ Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units-—whole numbers, halves, or quarters. *(CCSS.MATH.CONTENT.3.MD.B.4)* ▪ Reason with shapes and their attributes. ▪ Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape. *(CCSS.MATH.CONTENT.3.G.A.2)* ▪ Mathematical Practices ▪ Reason abstractly and quantitatively. *(CCSS.MATH.MP.2)* ▪ Construct viable arguments and critique the reasoning of others. *(CCSS.MATH.MP.3)* ▪ Model with mathematics. *(CCSS.MATH.MP.4)* **Madison Public Schools Profile of a Graduate** Analyzing: Examining information/data/evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. *(POG.1.2)*	**K2** a unit fraction is one of the equal parts into which a whole has been partitioned **K3** how to partition a number line into equal parts **K4** visual models can help generate and recognize equivalent fractions **K5** how to compare fractions with same numerators or same denominators **K6** to compare fractions they must refer to the same size whole **K7** a line plot represents mathematical data **K8** Vocabulary: numerator, denominator, fraction, half, partition, unit fraction, common fraction, equivalent fractions, sixths, fourths, eighths, thirds, twelfths **K9** rulers can be used to measure fractional lengths	part of a whole as a unit fraction of the whole **S2** representing fractions with denominators of 2, 3, 4, 6, and 12 using a variety of models **S3** locating fractions on a number line and placing fractions in their correct positions **S4** using number lines and other models to build, compare and explore equivalence of common fractions **S5** recognizing fractions that are equivalent to whole numbers **S6** explaining why two fractions are equivalent **S7** creating a line plot with halve and fourth inch data **S8** comparing two fractions with the same numerator or same denominator **S9** measuring to the nearest 1/2 and 1/4 inch **S10** reading a line plot