Bridging for Math Strength Resources

Standards of Learning Curriculum Framework (SOL)

Standard of Learning (SOL) 5.2b Compare and order fractions, mixed numbers, and/or decimals in a given set, from least to greatest and greatest to least

Student Strengths	Bridging Concepts	Standard of Learning
Students can compare 2 fractions using the symbols <, >, = and compare 2 decimals using the symbols <, >, =.	Students can compare and order 3 fractions or 3 decimals from least to greatest or greatest to least. Students can compare 1 fraction and 1 decimal.	Students can compare and order fractions, mixed numbers, and/or decimals in a given set, from least to greatest and greatest to least.

Understanding the Learning Trajectory

Big Ideas:

- Any number can be represented in an infinite number of ways that have the same value and can be compared by their relative values (Charles, p.10, p.14). In order to use reasoning skills when comparing fractions, it is important to have students notice what happens to the size of fractions when the numerator increases (e.g., $\frac{5}{9}$ compared to $\frac{6}{9}$) and also when the denominator increases (e.g., $\frac{2}{4}$compared to $\frac{2}{5}$). In terms of decimal reasoning, students need to develop the notion that there is what we call decimal density where in between any two decimals there are an infinite number of other decimals (Widjaja et al., 2008).
- Since fractions and decimals are essentially the same numbers in different forms, they can be compared and ordered. Fractions and decimals can be compared and ordered using a variety of strategies including using benchmarks (0, halves, wholes), drawing representations, placing them on a number line, naming equivalencies, and other reasoning strategies.
- Decimal to fraction equivalents can be named not just through procedures but through sense-making with our base-ten system (e.g. ⅖ = 4/10 = 0.4). For example, although one can use division with the fraction to find the decimal equivalent, another way is to find an equivalent decimal fraction with 10 or 100 in the denominator (e.g. 12/50=24/100=0.24).
  Math Strength Instructional Tips Video

Formative Assessment:

- Just in Time Mathematics Quick Check 5.2b PDF
- Just in Time Mathematics Quick Check 5.2b Desmos

Important Assessment Look Fors:

- The student uses an efficient strategy/strategies to order a set of decimals or fractions in seclusion (e.g. 5.009, 5.6, 5.67, 5.75).
- The student uses multiple strategies to compare and order fractions and decimals (benchmarks, equivalencies, close to a whole).
- The student determines a fraction or decimal number that can fit a series of given criteria (less than, greater than, or between two quantities).
- The student uses mathematical symbols <, >, = or ≠.

Purposeful Questions:

- Can you explain to me how you were able to determine that quantity *a* is less than/greater than/equal to quantity *b*?
- What strategy/strategies did you use in order to compare/order your numbers? Why was this an effective strategy?
- For which problems is it most efficient to use benchmarks to compare and order and for which did you find it necessary to do renaming? Why?
- How are the strategies you use to compare and order fractions similar or different to the strategies you use to compare decimals?

Bridging Activity to Support Standard	Instructional Tips
Routines Would You Rather? Comparing Two Fractions Number Talks	In the Would you Rather routine, make sure to include fractions greater than a whole (mixed and improper) as well as decimals to thousandths. Find more on Would you rather Use these number talks to help students use benchmark fractions to support conceptual understanding of size.
Rich Tasks The Tallest Bean Plant by Math Strength The Greatest Leftovers by Math Strength	In the Tallest Bean Plant task, students compare and order the decimal heights of bean plants. Then, determine the possible value of a missing decimal. Note common student misconceptions: 0.267 is larger than 0.65 and 0.9 because it has more digits, or .65 is larger than 0.9 because students do not compare the correlating place values. In the Greatest Leftovers task, students compare and order the fractional lengths of fabric from greatest to least. Then, determine the possible value of a missing fraction. Note common misconceptions or areas for growth: many students recognize that 1 ½ is largest but do not see 6/5 as the second largest due to lack of comprehension with improper fractions. Other students may think that ¾ and ⅘ are equivalent because they are both 1 piece. Finally, look for students who can compare ¾ and 3/6 either using benchmarks (½) or reasoning that in both situations they have 3 pieces but the pieces are different sizes.
Games/Tech	

Decio Theresa Wills	To find Decio (and other decimal games), scroll down to Decimal Games. In this game students compare and order decimals (tenths, hundredths, thousandths) from least to greatest. Watch this video on how to download and assign the game.
Pecking Order: Fractions and Decimals	Pecking Order is an educational game for kids to practice number values with fractions, percents (if ready), and decimals.
Comparing Number Values	Comparing Number Values is an educational game for kids to practice greater than, less than, and equal drills, comparing whole numbers, fractions, and/or decimals.
Desmos 5.2b Comparing and Ordering Fractions and Decimals	In this Desmos activity, students will compare and order fractions and decimals that extend to the hundredths place. Students have the option to utilize the hundredths grid to support their thinking. However, they can use any strategy that works best for them.
Desmos 5.2b Fraction/Decimal Clothes Line	In this Desmos activity, students will order fractions and decimals on an open number line.

Other Resources:

- Fraction and Decimal Benchmark Sort created by Bridging Math Strength Kristen Tangen: Match the fraction or decimal to the visual benchmark. Then play the attached game.
- Roll and Compare Decimal Game created by Bridging Math Strength Kristen Tangen: Roll dice and place the decimal to win each round.
- Chasing Gold: 3 Act Task to compare decimals to the hundredths.
- Final Lap: 3 Act Task comparing decimals to the thousandths.
- Comparing and Ordering Decimals/ Comparing and Ordering Fractions by Theresa Wills: Scroll down to her Decimals and Fractions Sections to find a large number of online games: Comparing Decimals Go Fish, Decimal Memory (not your traditional game!), fraction compare, Decio Ordering decimals, High-Low game, and much more. Print your own deck to play in person.
- VDOE Mathematics Instructional Plans (MIPS)
    - 5.2ab - Order Up! Equivalences and Ordering Fractions and Decimals (Word) / PDF Version
- VDOE Algebra Readiness Formative Assessments
    - SOL 5.2b (Word) / PDF
- VDOE Word Wall Cards: Grade 5 (Word) | (PDF)
    - Mixed Number
    - Equivalent

Learning Trajectory Resources:

Charles, R. (2005). Big ideas and understandings as the foundation for elementary and middle school mathematics. *Journal of Mathematics Education Leadership*, *7*(3), NCSM.

Common Core Standards Writing Team. (2019). Progressions for the Common Core State Standards for Mathematics. Tucson, AZ: Institute for Mathematics and Education, University of Arizona.

Van De Walle, J., Karp, K. S., & Bay-Williams, J. M. (2018). *Elementary and Middle School Mathematics: Teaching Developmentally.* (10th edition) New York: Pearson (2019:9780134802084)

VDOE Curriculum Framework for All Grades - Standard of Learning Curriculum Framework (SOL)

Widjaja, W., Stacey, K., & Steinle, V. (2008). Misconceptions about density of decimals: Insights from Indonesian pre-service teachers' work. Journal for Science and Mathematics Education in Southeast Asia, 31(2), 117-131