These connections are to be used as a resource to integrate and connect related concepts and skills that support and enrich the content standards.

Core Standard

5.2 Number and Operations and Algebra: **Develop an understanding of and fluency with division of whole numbers.**

Content Standards

5.2.1 Apply understanding of models for division (e.g., equal-sized froups, arrays, area models, equal intervals on the number line) and the relationship of division to multiplication to solve problems.

5.2.2 Apply concepts of place value and the properties of operations to solve problems involving division.

5.2.3 Select and use appropriate estimation strategies for division (e.g., use benchmarks. Overestimate, underestimate, round) to calculate mentally based on the problem situation when computing with whole numbers.

5.2.4 Develop and use accurate, efficient, and generalizable methods to find quotients for multi-digit division problems.

5.2.5 Develop fluency with efficient procedures for dividing whole numbers and justify why the procedures work on the basis of place value and number properties.

5.2.6 Determine the most appropriate form of the quotient and interpret the remainder in a problem situation.

Connections to the Standard

Key Connections to Prior Math Knowledge:

- In grade 1 the standards introduce the concept of inverse relationships. (1.2.5) In grade 3 students worked on multiplication and division as inverse operations. (3.2.5) Now they strengthen their awareness of the inverse multiplication/division relationship.
- Now place value concepts, first specified in the grade 1 standards through tens (1.1.4), then including hundreds in grade 2 (2.1.4), and including values to hundredths in grade 4 (4.1.1), become essential as students solve problems involving division.
- In grade 2 students estimated sums and differences. (2.2.4)
- In grade 4 the standards call for estimation of decimal and fractional amounts to solve problems. (4.1.5)
- Now students must use estimation to make mental math calculations for division.
- Division as repeated subtraction is introduced in grade 3. (3.2.3)

Key Connections to Future Math Knowledge:

- Students will estimate quotients in grade 6. (6.1.1)
- Grade 6 standards include solving problems using division of fractions and decimals. (6.1.2 and 6.1.3)
- They will develop and justify procedures for dividing fractions and decimals in grade 6 and understand the inverse multiplication/division relationship. (6.1.4)

Key Connections to Current Grade Level Math Standards:

- Students who understand that division is everywhere in their daily lives can more easily appreciate the task of dividing. Serving soup and hamburgers at the dinner table is dividing. Choosing teams on the soccer field is dividing. Playing cards is dividing. (5.2)

- Grade 5 students are not too sophisticated to divide using manipulatives. Frequent practice with different manipulatives—mathematics program supplies as well as realia—will enable students to draw pictures of division problems and solidify the concepts. Then students move to the paper and pencil problem solving. (5.2.1, 5.2.2, 5.2.4 through 5.2.6)
- Real world problems with division help students with the concepts of over- and underestimation. A typical problem might involve six-packs of juice for a class picnic, to serve a number of students that is not a multiple of six. (5.2.3)

Key Connections to Other Content Areas:

- Science
  - Relate division concepts to introduce cell division in plants and animals.
  - Describe population density by dividing total populations
  - Divide liquids among containers. (SC.05.PS.01.01)
  - Using magnets divide piles of clips or fasteners. (SC.05.PS.04.01)
  - Use a recycling program to divide materials by their properties. (SC.05.ES.01.03 and SC.05.ES.01.04)
- Social Sciences
  - Explain the division of responsibilities among government agencies. (SS.05.CG.02.01)
  - Describe the division of roles and responsibilities among the three branches of government. (SS.05.CG.03)

Key Connections to Real World:

Vocabulary:

area	equal-sized	quotient
array	estimate	remainder
divide	interval	round
division	overestimate	underestimate

Language of Math:

- Description of place value designations
- The meaning and use of *each* because of its frequency in conversations about division
- The meanings of *over-* as in *overestimate* and *under-* as in *underestimate* to indicate bigger than and smaller than
- Description of the procedure for dividing
- How to read a division problem, and the quotient and remainder

Common Mistakes and Associated Misconceptions:

- Students confuse *hundreds* and *hundredths*.
- Students look for a quotient that is greater than the divisor and/or the dividend.
- A remainder is the quantity of divisors left over, e.g., Ten divided by three equals three and one group of three left over.