



Bridging for Math Strength Resources

Standards of Learning Curriculum Framework

Standard of Learning (SOL) 5.3b Identify and describe the characteristics of even and odd numbers.



Student Strengths	Bridging Concepts	Standard of Learning
Students can read, write, and identify the place and value of each digit in a nine-digit whole number Skip count by 2s. Students can use a variety of manipulatives (base ten blocks, tiles, etc.) to represent a given number.	Students can determine if a number is divisible by 2 by using manipulatives. Students can then create a rule based on observed patterns.	Students can identify and describe the characteristics of even and odd numbers. <i>*Note: Student are only assessed up to 2 digit whole numbers*</i>

Understanding the Learning Trajectory

Big Ideas:

- **PATTERNS:** Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways. Known elements in a pattern can be used to predict other elements (Charles, 2005).
- All whole numbers can be categorized into the subset of odd or even numbers. These numbers follow an infinite pattern of even, odd.
- All whole numbers are divisible by 2. A number is even only if it can be divided by 2 and results in a whole number answer. (For example, 7 is not an even number although it can be broken into two equal groups of 3.5).
- Even numbers are divisible by 2 and thus a rule can be created that all even numbers have a 0, 2, 4, 6, or 8 in the ones place; while all odd numbers are not divisible by 2 and therefore have a 1, 3, 5, 7, or 9 in the ones place.
- When finding the sum of two whole numbers, one can predict whether the answer will be odd or even. The sum of two even numbers or two odd numbers will always result in an even number. The sum of an odd and even number will always result in an odd number.

Formative Assessment:

- VDOE Just in time Quick Check SOL 5.3b [PDF](#) / [Desmos](#)

Important Assessment Look Fors:

- The student determines if a series of two digit numbers written in standard form are odd or even.
- The student draws a model to represent a number as even by being able to be broken into groups of 2 or 2 equal groups (demonstrate divisibility by 2), rather than simply relying on rules such as “Numbers with a 0, 2, 4, 6, or 8 in the ones place are even.”
- The student uses a model to represent how the sum of two odds will always result in an even number. The student should be able to represent the “leftovers” of an odd number coming together with another and explain why this will always happen.
- The student draws an accurate depiction of the difference between an odd and even number and supports their model with a description or equation(s).

Purposeful Questions:

- What is an efficient strategy for determining if a number is odd or even? Can you do this without having to draw a picture?
- How can you use a model to prove your answer?
- Can you create multiple equations that will prove or disprove your thinking?

Bridging Activity to Support Standard	Instructional Tips
Routines: Even or Odd School Days Sometimes, always, or Never	For each day of school, students will determine if the day’s number is odd or even. For example, on the 5th day of school students will determine 5 is odd because it is not divisible by 2. However, they will determine that 6 is divisible by 2 and therefore is even. Continue this routine as long as students need until they can create a generalized pattern. Read a statement and determine if it is sometimes, always, or never true. Extension: have students write their own statements and support their answers.
Rich Tasks: Can Everyone Play?	There are two versions of this task. In version A, students are given the number of students in 6 classes and asked if, when divided to play tennis (in groups of 2), will everyone be able to play or will someone be left out? In version B, students are told the gym teacher looks at his rosters and sees that in 5 classes everyone will have a partner, but in 4 classes there will be a student left out. Students are asked to determine the possible number of students in each class. Possible extensions: A) Make a rule for determining if a student will be left out. B) If the gym teacher decides to teach doubles tennis instead, in which four players are needed for each game, which class rosters will have someone left out or not?
Games: Pairs or Leftover Odd or Even Combinations	The Pairs or Leftover game is for students who are just beginning to investigate the concepts of odd or even numbers and should be played with the teacher. This game is meant as a lesson to introduce the concept. In the Odd or Even Combinations game, students pick three cards and try to make as many odd or even numbers as possible.
Other Resources: • VDOE Mathematics Instructional Plans (MIPS) ◦ 5.3b - Partners and Leftovers: Exploring Odd and Even Numbers (Word) / PDF • VDOE Algebra Readiness Formative Assessments	

- [SOL 5.3b](#) (Word) / [PDF](#)
- VDOE Algebra Readiness Remediation Plans
 - [Even or Odd](#) (Word) / [PDF](#)
- VDOE Word Wall Cards: Grade 5 ([Word](#)) | ([PDF](#))
 - Even and Odd Numbers
- [Online Odd or Even Carroll Diagrams](#) from Topmarks.co.uk
- [Printable Numicon Shapes](#) Utilize these great visuals of odd and even numbers to have students investigate adding odd and even numbers.
- [Odd and Even Sums](#) Game: This game is for students who are ready to explore what patterns exist when you find the sum of odd and/or even addends.

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.
- Clements, D. H., & Sarama, J. (2019). Learning and teaching with learning trajectories [LT]2. Marsico Institute, Morgridge College of Education, University of Denver. <https://www.learningtrajectories.org/>
- 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.
- Richardson, K. (2012). How Children Learn Number Concepts: A Guide to Critical Learning Phases. Bellingham: Math Perspectives Teacher Development Center.
- 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 \(SOL\)](#)