



# Adding Up the Number Line

Early Years and Primary

Number Sense and Numeration

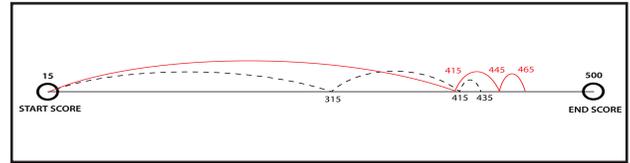
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Adapted from a math lesson at Equinox Holistic Alternative School, Toronto

## Curriculum Goals (From the Ontario Ministry of Education Curriculum Document)

### Grade 3 - Number Sense and Numeration

- Identify and represent the value of a digit in a number according to its position in the number
- Solve problems involving the addition and subtraction of two-digit numbers, using a variety of mental strategies



## Context

Whole class instruction and pairs/small groups.

## Materials

- One die per group (2-3 students)
- One blank piece of paper per group
- A different coloured writing utensil for each player

## Summary

In this simple addition and subtraction game, players attempt to arrive exactly at 500 on the number line. This is accomplished by rolling a die each turn and deciding whether the number rolled should have a ones value, a tens value or a hundreds value.

## Rules of the Game

- The object of the game is to arrive exactly at 500, the END SCORE, on a drawn number line before your opponent. This game can be played in pairs or small groups and though described competitively, can also be played cooperatively.
- To begin, draw a blank number line on a piece of paper. Each player will represent their PLAYER SCORE, separate of other players, on the number line, marking their score in the colour they choose.
- Before the game begins, a die is rolled twice and the smaller of the two possible combinations is taken as the START SCORE on the number line. For example, if a 5 and a 1 are rolled, the two possible number combinations are 51 and 15; 15 is smallest, so it will be taken as the START SCORE on the number line.
- The order of play is decided with each player rolling the die once. The player with the smallest number goes first.
- With the number line prepared, the game now begins. Each player rolls the die once in turn. Every number rolled on the die, except 5, allows that player to choose if they would like that number to represent a one, a ten or a hundred value. For example Player 1 rolls a 4, they can either add 4, 40 or 400 to the START SCORE in the first round or to their PLAYER SCORE subsequently. Given that the START SCORE is 15, adding 400 would bring them closest to arriving at 500 so they will mark their second spot on the number line at 415, which will become their PLAYER SCORE. Then Player 2 will roll the die, adding the number they roll to the START SCORE, and the game will continue back and forth.
- If a player rolls a 5, then the other player (if there are more than two people playing, the player they choose) will have to move back 50 on the number line. For example if Player 1 rolls a 5, Player 2 will have to subtract 50 from their PLAYER SCORE; if Player 2 was at 487 then they will move back to 437.
- If a player is close to 500, and the number they roll will take them past 500, then they must subtract that number from their PLAYER SCORE. For example, if Player 1 is at 497 and rolls a 6, which used as a one value will take them to 503, they must instead subtract 6 from their score, moving them back to 491.

## Instructions

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1. Introduce the game to the whole class by drawing a blank number line on the board with only the END SCORE written. Explain the object of the game and what the students must do before beginning.
2. Choose a child as your playing partner to model how the game is played with the whole class. Begin by rolling the die twice to create the START SCORE, then begin playing.
3. Roll the die and explicitly state your options (ex. 2, 20, 200), then ask the class which option would be best to get you closest to the END SCORE. Will adding 2, 20 or 200 to the START SCORE get me closest to 500 without going past it? Which option would be best? Write your new PLAYER SCORE on the number line in a different colour to mark your movement.
4. Now the student rolls the die and tells the class their roll. Ask the student what value would be most beneficial for the number they have rolled. Explain that they will also start from the START SCORE. Encourage the children to think strategically with their choice of place value.
5. During the next round, explicitly choose a place value that is not the most useful to you arriving at the END SCORE. See if the students can catch your mistake. If they don't, demonstrate your thinking out-loud ex. Will 600 take me closest to 500 without going over? Or would something else be better?
6. Play a few more rounds with the child in front of the class, to show how the game progresses, then explain what happens when a 5 is rolled, or when a player nears the end of the game.
7. Have the students form pairs or groups of 3 and provide each group with a blank piece of paper for their number line, different coloured writing utensils and a die to begin playing. Allow the students about 15 minutes to play the game.

## Questions to Extend Student Thinking

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- What do you think is the best way to get close to 500 from the number you rolled? How will you figure out your new PLAYER SCORE?
- Are you using any strategies to win the game? Which number do you need to roll to win?

## Look Fors:

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- Are children able to perform addition and subtraction mentally? Do they perform operations correctly? This can be assessed with the help of the strategies they employ to add or subtract from their PLAYER SCORE.
- Do children understand place value when deciding whether to make their number a one, ten, or hundred? Are their choices logical to win the game?