

# 5 Great Reasons to Teach Number Lines

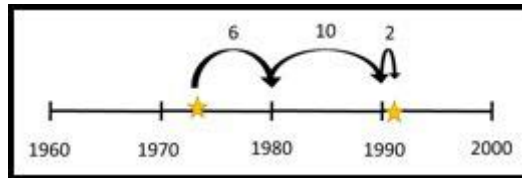
by Melissa Braaten

I am an adult education teacher, therefore I never have enough time with my students. I want my students to be able to problem solve a wide range of mathematical problems, but I also want to ensure that they leave me with a deep conceptual understanding of the material they have studied. To this end, I find that I am always trying to prioritize my math curriculum to figure out which core concepts or big ideas will make the most of our precious and limited time. Recently, I have discovered that one of my favorites is teaching number lines.

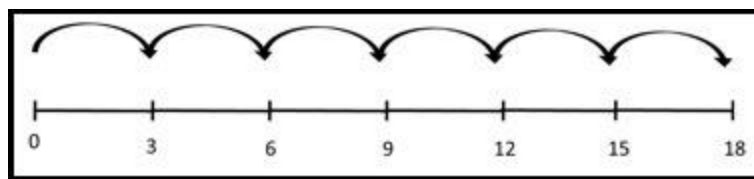
I decided to cover a short unit on number lines with whole numbers with my level A (GLE 1-4) class this past spring. I figured it would be a quick topic, but as we started exploring number lines together, the material proved to be mathematically rich and highly relevant. We ended up spending an entire eight-week unit on number lines with whole numbers, and I still think it is one of the most valuable units I have ever taught. Here are some of the reasons that time spent teaching number lines is time well spent:

**1. Number lines are a great modeling tool for visual learners.** Part of our unit had us exploring different operations on the number line, and many students had some real “aha” moments. For example, number lines help to demonstrate some different ways of thinking about subtraction.

*Donna was born in 1974 and Carlos was born in 1992. How much older is Donna?*  
(Subtraction as comparison rather than “take away”.)



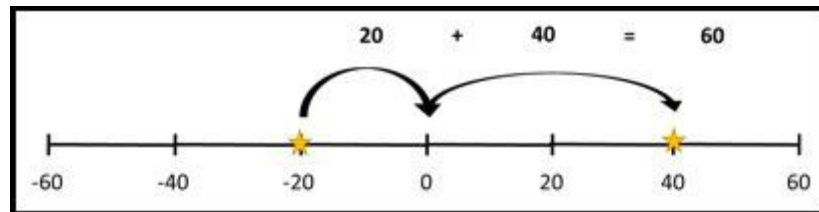
When we drew multiplication on the number line as repeated jumps of a certain size, some students were amazed to see how they could visualize closely related division facts:



- 6 “jumps” of 3 is 18. ( $6 \times 3 = 18$ )
- How many 3’s fit in 18? ( $18 \div 3 = 6$ )
- If you share \$18 with 6 people, how much does each person get? ( $18 \div 6 = 3$ )

**2. Number lines provide excellent fluency practice with all operations.** Students created and filled in number lines following the rule of “equal spaces (jumps) have equal values”, which required them to compute constantly in order to follow this rule. Different sized intervals allowed for easy differentiation (some students worked with intervals of 2, 5, and 10, while others challenged themselves with jumps of 250, .50, etc.). Students also discovered that they could divide (that most dreaded operation) to break a long interval up evenly, but that their division could be easily checked with other operations (Am I still adding up by 5s?).

**3. Number lines prepare students to think about signed numbers and signed number operations.** By the end of our number lines unit, my very early level students were ready to start conceptualizing negative numbers, with their understanding of the number line as a visual model. We looked at what would happen when you kept taking equal jumps below 0, and their familiarity with the left to right or up and down orientation helped them understand why negative numbers “appear” to grow backwards (why -1 is greater than -100, for example). We also used number lines to look at the “difference” between high and low temperatures and why this difference is so large when we have numbers on opposite sides of zero. When I connected this to the (half-remembered) rule for “switching the sign” when subtracting a negative number, one student remarked, “Wow, that actually makes sense now.”



**4. Number lines are an important preparation for coordinate graphing and scale.** One student attended both levels of math concurrently in the same cycle, going from number lines in level A to a unit on linear algebra in level B. Teaching the two in tandem, I came to appreciate how important an understanding of number lines and equal increments is to becoming fluent with coordinate graphing and axes. While my more advanced students struggled constantly with correctly labeling their intervals, the student who had been working with me on number lines connected them easily to her coordinate axes. Her greater fluency with number lines meant she was able to devote more energy to thinking about which scale would be appropriate for the task at hand.

**5. Number lines have numerous and immediate applications to adult life.** Oven dials. Thermometers. Time lines. Analog clocks. The further we went in our unit, the more applications began to appear. I also came to appreciate (once again) how powerful adult learning can be. During our unit, I purchased an outdoor thermometer and put it in the window of the classroom. I quickly discovered that many students were not comfortable reading the thermometer if the dial was not pointing to a labeled mark; they were not sure how to figure out, for example, what the mark halfway between 40 and 60 would stand for. (Some voted 45 and others voted 50. It led to an illuminating discussion.) I thought about how long it took before I learned to use an electric drill: not because it was too hard, but because it becomes habitual to avoid things we don't know how to do. Now I pick up a drill whenever I can, and every time it makes me feel a little proud.

There are many other (mathematical and practical) reasons to work number lines into your curriculum. Visualization (in this case, using number lines) is a big idea that can be traced through the CCSSAE beginning with whole number operations (at level B) and touching topics including fractions, decimals, data, measurement, coordinate geometry, rational numbers, through the inclusion of irrational number approximations (Level D). The idea is not to teach every possible application of number lines in one unit, but instead to weave them into appropriate units at the appropriate level for your students. Big ideas in mathematics are ideas that keep coming back, illustrating the overall COHERENCE of mathematics as a field of knowledge.

*This article is also available at:*

<https://adulnumeracyatterc.wordpress.com/2016/08/29/5-great-reasons-to-teach-number-lines/>