

Empty Number Line



EMPTY NUMBER LINE

An integrated Science and Mathematics exploration

Developed by S Dole¹, D. Clarke², T. Wright¹ & G. Hilton¹



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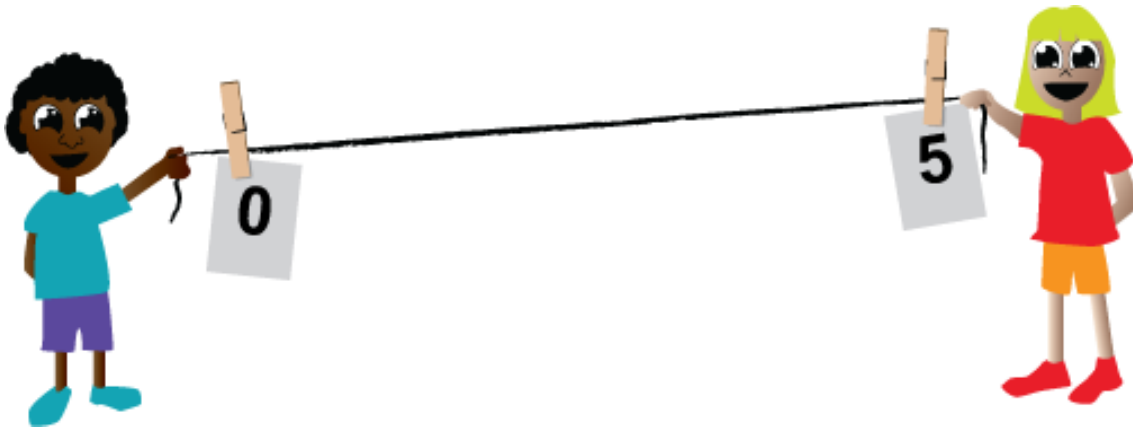


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Empty Number Line

The empty number line can be used to promote multiplicative thinking and number sense. Using a piece of washing line, some pegs and some cut-out numbers can be used to enhance students' understanding of whole numbers, decimals, fractions, percentages.



- 1 Get two volunteers to hold the line tight.
- 2 Peg the zero card at one end and the five card at the other.
- 3 Get another volunteer to peg the number 2 card on the number line.
- 4 Ask the class to determine how a check could be done to find out the accuracy of the position of the 2 card (fold the zero position to the two position and halve to find the 1 position, then fold five times to see how close to the pegged five this position is. Students need to be able to see that there are five equal intervals between the zero and the five).

Where are they?

Try the following combinations:

Pegs		Find
6	10	9
5	14	7
50	80	70
0	2	$1\frac{2}{3}$
1	2	$1\frac{2}{3}$
2	3	$2\frac{1}{4}$
0	1	0.6
2	4	3.5
0	1.5	1.25
0	1	25%
0	1	80%
0	1	30%

Ordering numbers

Place the following number sets in the correct place on the number line

2	1.5	$\frac{3}{4}$	
$\frac{3}{4}$	$2\frac{1}{2}$	0.6	
20%	2	0.8	
25%	$\frac{1}{4}$	0.25	2
$\frac{1}{8}$	$1\frac{1}{4}$	$\frac{3}{6}$	

Visualising number lines

Imagine a number line, and locate the numbers 1 and 2

- now locate 0
- now locate -1 and -2
- now locate 23
- now locate 101
- now locate -99

Where are these numbers?

What can you say about numbers? (infinite)

Moving around the number line

What number is three to the right of 5?

What number is six to the left of 4?

What number is twice as far from 3 as from -7? (There are two possible answers: 23 or -17)

What number is half as far from 9 as from 5? (There are two possible answers: 11 or 7)

What number is three times as far from 6 as from -1? (There are two possible answers: 27 or -15)

What number is one-fifth as far from -5 as 10? (There are two possible answers: -2 or -8)

Conceptualising very small numbers

Locate the half-way point between 1 and 2.

- What is its decimal name? (1.5)
- Focus on the point whose decimal name is 1.6
- How far apart are 1.5 and 1.6? (one-tenth)
- What about the point half-way between 1.55 and 1.56? (1.555)
- Draw and redraw the number line to show these points.

Conceptualising very small numbers

What is the decimal name of the point one-tenth of the way from 1 to 2?	(1.1)
What is the decimal-name of the point one-tenth of the way from 1.1 to 1.2?	(1.11)
What is the decimal-name of the point one-tenth of the way from 1.11 to 1.12?	(1.111)
What is the decimal-name of the point one-tenth to the right of 1?	(1.1)
What is the decimal-name of the point one-hundredth to the right of that?	(1.01)
What is the decimal-name of the point one-thousandth to the right of that?	(1.001)
Keep going until you have established a pattern and can explain it to colleagues.	

Locate the following numbers on a number line. How far apart are each pair?

- 1.7 and 1.8
- 1.73 and 1.74
- 1.732 and 1.733
- 1.7320 and 1.7321

These exercises help to establish a feel for the magnitude of decimal numbers, the infinite numbers that can be located on the number line, the fluid nature of the number line, the insignificance in the decimal places beyond thousandths.