(4) Comparing Representations of Five-Digit Numbers

## Things You Can Show About a Number

Different ways of representing a number can make it easier to see different things about that number.

Here are some things you might show about a whole number using a particular representation:
- whether it's even or odd
- whether it's less than or greater than another number
- whether it's half or double another number
- whether you can group it into equal groups

Representing a Number in Different Ways

Here are some ways to represent 20 000 with notes about what each representation shows about 20 000 and what it doesn't show as well.
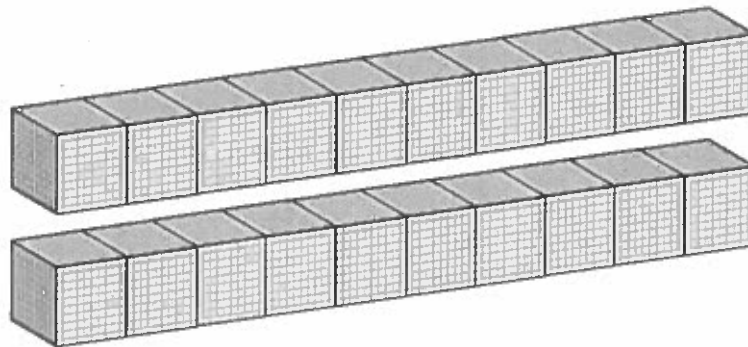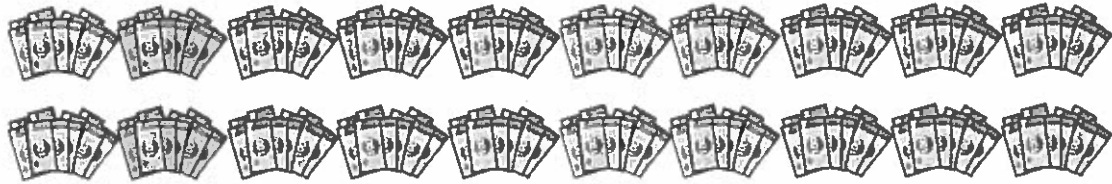

This shows visually that ...
- 20 000 is 2 ten thousands since there are 2 ten thousands blocks.
- 20 000 is 20 thousands since there are 20 thousands blocks altogether.
- 20 000 is an even number since it could be shared equally by two people (each would get 1 ten thousands block).

What it doesn't show as well:
This representation makes it a bit more difficult to see that 20 000 can be grouped in equal groups of 4 since you'd have to count the number of groups of 4 small blocks

Representing a Number in Different Ways (continued)

This shows visually that …
- 20 000 is 200 hundreds.
- 20 000 is an even number since two people could share the bills equally (each would get one set of 100 $100 bills.)

What it doesn't show as well:
This representation makes it a bit more difficult to see that 20 000 is the number that comes right after 19 999.

Ten thousands	Thousands	Hundreds	Tens	Ones
• •				

This shows visually that …
- 20 000 is 2 ten thousands.
- 20 000 is greater than 10 000.
- 20 000 is an even number.

What it doesn't show as well:
This representation doesn't show what other groups 20 000 can be grouped into or how it compares with other numbers.

10 000 + 5000 + 5000

This shows visually that …
- 20 000 is more than 10 000 since you add 5000 + 5000 to 10 000 to get 20 000.

What it doesn't show as well:
This representation makes it a bit more difficult to see that 20 000 is even. You can see that two people could each get 5000, but you'd have to figure out if 10 000 could be split two ways equally (it can, but it's not visually obvious).

Representing a Number in Different Ways (continued)

30 000 – 10 000

This shows visually that ...
- 20 000 is less than 30 000 since you subtract from 30 000 to get to 20 000.

What it doesn't show as well:
This representation makes it a bit more difficult to see that 20 000 is greater than 10 000.

Notes

You may be wondering why we are focusing on different representations of a number and what they show about the number. This is important for getting students ready for more complex mathematics, but it is also useful now to provide students with more tools for visualization and for showing their mathematical thinking.

Definitions

even number: a whole number that can be grouped into two equal groups; for example, 100 is even because 100 = 50 + 50

odd number: a whole number that cannot be grouped into two equal groups; for example, 101 is odd because 101 = 50 + 50 + 1