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## Chapter 1

## Numbers

### 1.1 Exponential Notation

Exponential notation is a simplified way of expressing repeated multiplication. It is particularly useful when writing large numbers. In this unit, your child will learn to write numbers in exponential notation and solve problems involving exponents.

For $2^{3}$, we say " 2 to the power of $3^{\text {" }}$ or "2 to the third power".



Writing numbers to the power of 10 is a very useful way of expressing large numbers such as 1 million and 10 billion.


### 1.2 Whole Numbers

Your child has learned to write whole numbers in standard form, expanded form, and words. In this unit, he or she will learn to express whole numbers in expanded form as powers of ten. Encourage your child to use a place value chart to record numbers. This can help him or her visualize the value of each digit and read numbers in groups of three.

Numbers in Expanded Form

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Place Value Chart

| Millions |  |  |  | Thousands |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Hundred | Ten | One | Hundred | Ten | One | Hundreds | Tens | Ones |  |  |  |
| 100000000 | 10000000 | 1000000 | 100000 | 10000 | 1000 | 100 | 10 | 1 |  |  |  |
| $10^{8}$ | $10^{7}$ | $10^{6}$ | $10^{5}$ | $10^{4}$ | $10^{3}$ | $10^{2}$ | $10^{1}$ | $10^{0}$ |  |  |  |
|  | $\mathbf{1}$ | $\mathbf{5}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{6}$ | $\mathbf{4}$ | $\mathbf{0}$ | $\mathbf{7}$ |  |  |  |

- in Expanded Form:

$$
10000000+5000000+200000+30000+6000+400+7
$$

- in Expanded Form Using Powers of 10:

$$
1 \times 10^{7}+5 \times 10^{6}+2 \times 10^{5}+3 \times 10^{4}+6 \times 10^{3}+4 \times 10^{2}+7 \times 10^{0}
$$

The powers of 10 represent the number of zeros.

$$
\text { e.g. } \frac{1}{\frac{000000}{6 \text { zeros }}}=10^{6}
$$

$$
\begin{aligned}
5000000 & =5 \times 1000000 \\
& =5 \times 10^{6}
\end{aligned}
$$

