Models for Division

READ: Division of Whole Numbers (pp. 127-133)

Repeated subtraction model

This model builds on prior knowledge of subtraction and can be related to skip counting.

> EXAMPLE: 28 ÷ 7 can be modeled by repeated subtraction; note 7 is subtracted four times to reach zero.

$$
\begin{array}{r}
28 \\
- 7 \\
\hline
21 \\
-7 \\
\hline
14 \\
-7 \\
\hline
7 \\
-7 \\
\hline
0
\end{array}
$$

Partition model

This model separates the whole set of objects or number into groups, <u>one by one</u>, to find out how many should be in each group.

> EXAMPLE: Meagan has 120 cookies to put into 24 bags to share with her class for a party. She puts one cookie in each bag, dealing them out one by one until they are all gone. How many cookies are in each bag?
>
> 120 ÷ 24 = 5 cookies in each bag

Measurement model

This model divides by "measuring off" a given amount over and over until the entire amount is gone. If we want to divide 36 by 9, we can ask, "How many nines are in 36?" We can then "measure off" 9 again and again until 36 is all measured. We would need to measure off 9 four times.

> EXAMPLE: Will has 12 cookies and wants to package them in groups of four. How many packages of cookies will he have?
>
> 12 ÷ 4 = 3 packages of cookies

Cookies
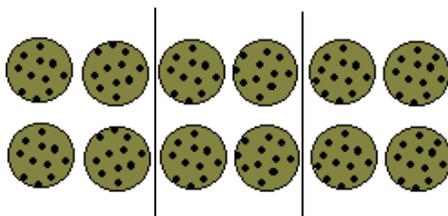
Missing-factor model

This model is based on inverse operations. Since division is the inverse of multiplication, we can use our prior knowledge of multiplication fact families to identify the "missing" factor.

> EXAMPLE: Brighitta needs to solve 18 ÷ 3. She remembers that 3 x 6 = 18, so the missing factor is 6. In other words, the fact family involves 3, 6, and 18. Since 3 and 18 are used in the problem, the missing factor of 6 is the answer. This model is especially helpful later when students begin learning algebra and the letter *x* stands for the missing factor.

Number line model

This model uses the number line to demonstrate how an amount can be measured off in groups. The example below shows how 6 ÷ 3 = 2 because measuring off lengths of three from six results in two sections and no left over pieces.