Modeling Division Using Number Lines
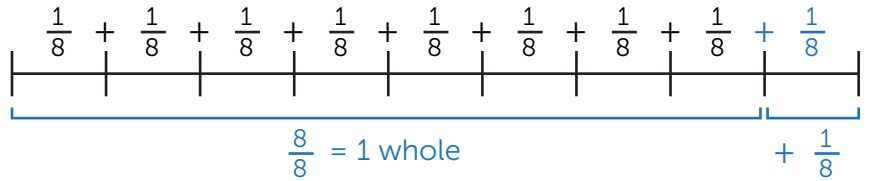
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When dividing whole numbers, it can be helpful to show division as a form of multiplication to model the result on a number line. This can be done in three easy steps!

Consider   9 ÷ 8

Step 1: *Express the division statement 9 ÷ 8 as a multiplication expression: 9 x 1/8.*

Observe how: $9 \div 8 = \frac{9}{8}$

$\frac{9}{8} = 9 \times \frac{1}{8}$

Step 2: *Graph the multiplication expression 9 x 1/8 on a number line.*

$\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$

$\frac{8}{8}$ = 1 whole $+ \frac{1}{8}$

Step 3: *State the equation, including the quotient:* $9 \div 8 = 1\frac{1}{8}$

Step One Exercises

Directions: *Express each division statement as a multiplication expression.*

1. $8 \div 6 =$ _____ $8 \times \frac{1}{6}$ _____
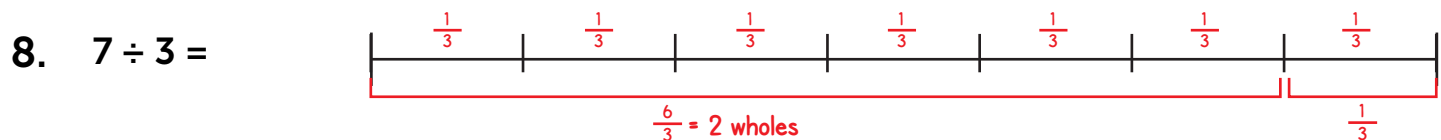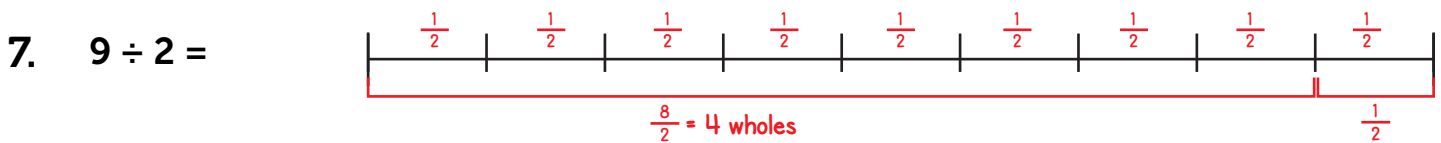
2. $9 \div 2 =$ _____ $9 \times \frac{1}{2}$ _____

3. $7 \div 3 =$ _____ $7 \times \frac{1}{3}$ _____

4. $12 \div 2 =$ _____ $12 \times \frac{1}{2}$ _____

5. $10 \div 3 =$ _____ $10 \times \frac{1}{3}$ _____

Step Two Exercises

Directions: *Graph the multiplication form of each statement on a number line.*

6. $8 \div 6 =$

$\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$

$\frac{6}{6}$ = 1 whole $\frac{2}{6}$

7. $9 \div 2 =$

$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

$\frac{8}{2}$ = 4 wholes $\frac{1}{2}$

8. $7 \div 3 =$

$\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$

$\frac{6}{3}$ = 2 wholes $\frac{1}{3}$

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9. 12 ÷ 2 =

$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

$\frac{2}{2}$ = 1 whole $\frac{2}{2}$ = 1 whole $\frac{2}{2}$ = 1 whole $\frac{2}{2}$ = 1 whole $\frac{2}{2}$ = 1 whole $\frac{2}{2}$ = 1 whole

10. 10 ÷ 3 =

$\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$

$\frac{9}{3}$ = 3 wholes $\frac{1}{3}$
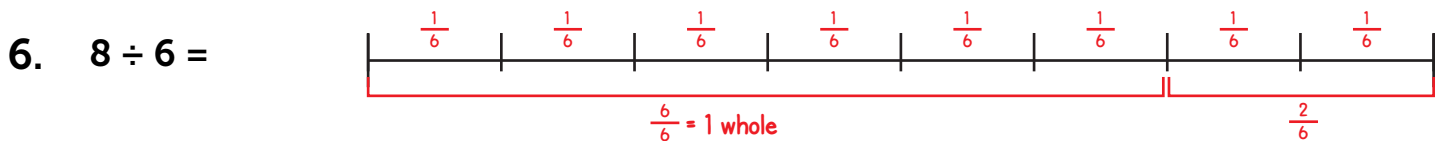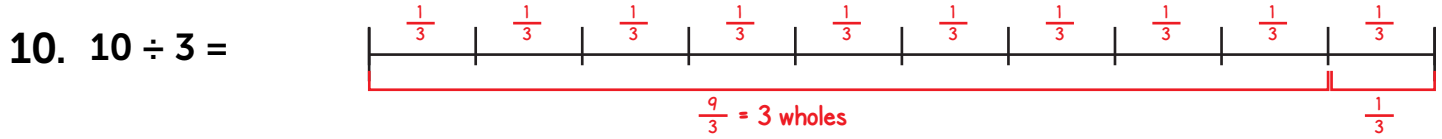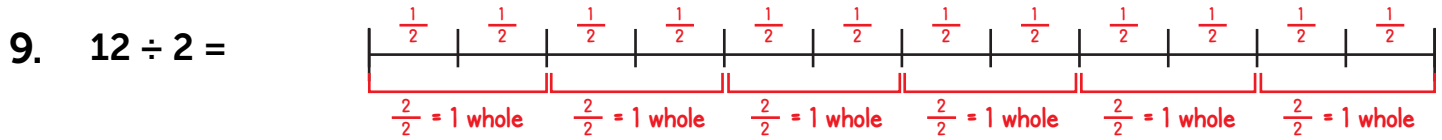
Step Three Exercises

Directions: *State the quotient for each exercise.*

11. 8 ÷ 6 = $\quad 1\frac{2}{6}$

12. 9 ÷ 2 = $\quad 4\frac{1}{2}$

13. 7 ÷ 3 = $\quad 2\frac{1}{3}$

14. 12 ÷ 2 = $\quad 6$

15. 10 ÷ 3 = $\quad 3\frac{1}{3}$

Try These

Directions: *Solve each of the following division expressions using the three-step procedure.*

16. 9 ÷ 6 = $1\frac{3}{6}$

$9 \times \frac{1}{6}$

$\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$

$\frac{6}{6}$ = 1 whole $\frac{3}{6}$

17. 10 ÷ 2 = 5

$10 \times \frac{1}{2}$

$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

$\frac{2}{2}$ = 1 whole $\frac{2}{2}$ = 1 whole $\frac{2}{2}$ = 1 whole $\frac{2}{2}$ = 1 whole $\frac{2}{2}$ = 1 whole

18. 8 ÷ 3 = $2\frac{2}{3}$

$8 \times \frac{1}{3}$

$\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$

$\frac{3}{3}$ = 1 whole $\frac{3}{3}$ = 1 whole $\frac{3}{6}$