

PART I GET STARTED**Today's Mathematics**

We will use models to multiply fractions and mixed numbers.

Essential Question

What does it mean to multiply fractions?

DO NOW | Review what you already know

1. Simplify $\frac{6}{18}$.

2. Write $\frac{1}{2}$ with denominator 6.

3. Write $2\frac{1}{4}$ as an improper fraction.

4. Find 7×8 .

SEE IT | A part of a part

A bottle is half full. You drink two-thirds of the water in it. How much of the whole bottle do you drink?

Use the strip. Mark the half-full amount, split that amount into three equal parts, then shade the two parts you drink.

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Fraction of the whole bottle you drink:

QUICK WRITE | 2 minutes

Why is the amount you drink less than half of the whole bottle?

PART II INVESTIGATE

SHADE, COUNT, AND LOOK FOR A PATTERN

Work with a partner. Each rectangle is one whole. Shade the first fraction across the columns. Mark the second fraction across the rows using a different pattern. Count the cells marked both ways.

1. $\frac{1}{2} \times \frac{2}{3}$

Total equal cells:

Cells marked both ways:

Product in simplest form:

2. $\frac{3}{4} \times \frac{2}{3}$

Total equal cells:

Cells marked both ways:

Product in simplest form:

3. $\frac{2}{3} \times \frac{3}{5}$

Total equal cells:

Cells marked both ways:

Product in simplest form:

CONNECT THE MODELS TO A RULE

What do you notice about the numerators and denominators? Use your models to explain a rule for multiplying fractions.

PART III MAKE SENSE AND PRACTICE**WHAT WE CAN CONCLUDE**

“Of” can mean multiply. Multiply the numerators and multiply the denominators. Simplify the product. For mixed numbers, first write improper fractions. A product names a part of a part.

WORKED MODEL

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

One and one-half is three halves. Two-thirds of three halves is one whole.

Divide out common factors before multiplying if helpful. A square means multiply a fraction by itself.

For example: $(\frac{2}{5})^2 = \frac{2}{5} \times \frac{2}{5} = \frac{4}{25}$

MUST DO | Show work. Write each product in simplest form.

1. $\frac{3}{5} \times \frac{1}{4}$

2. $\frac{4}{9} \times \frac{3}{8}$

3. $2 \frac{2}{3} \times \frac{3}{4}$

4. $1 \frac{1}{2} \times 2 \frac{2}{5}$

5. A rectangular mat is $2\frac{1}{2}$ feet long and $1\frac{1}{3}$ feet wide. Find its area.

READY FOR MORE

6. A student says multiplying always makes a number larger. Use a fraction example to explain why this is not always true.

PART IV PUZZLE PRACTICE

Why did the turkey volunteer to be the drummer in the popular bird band?

Multiply. Simplify. Match each result to a letter in the answer bank on page 5. Write that letter above its exercise number in the decoder.

1. $\frac{1}{8} \times \frac{3}{5}$

2. $\frac{1}{6} \times \frac{3}{8}$

3. $\frac{3}{4} \times \frac{9}{13}$

4. $\frac{5}{6} \times \frac{6}{7}$

5. $\frac{5}{16} \times \frac{1}{10}$

6. $\frac{3}{14} \times 12$

7. $8 \times \frac{9}{10}$

8. $\frac{5}{7} \times \frac{5}{8}$

9. $\frac{14}{15} \times \frac{5}{7}$

10. $1 \frac{1}{4} \times \frac{3}{4}$

11. $7 \frac{1}{2} \times \frac{4}{5}$

12. $\frac{5}{8} \times 1 \frac{3}{5}$

Continue with problems 13–22 and decode on the next page.

PART IV PUZZLE PRACTICE | continued

13. $6\frac{1}{4} \times \frac{2}{5}$

14. $2\frac{7}{10} \times \frac{5}{9}$

15. $\frac{2}{9} \times 3\frac{1}{6}$

16. $1\frac{5}{7} \times 21$

17. $4\frac{3}{8} \times 2\frac{2}{7}$

18. $\frac{1}{8} \times \frac{3}{5} \times \frac{2}{3}$

19. $\frac{6}{7} \times \frac{6}{7}$

20. $(\frac{2}{5})^2$

21. $(\frac{3}{4})^2 \times \frac{1}{3}$

22. A photo is $5\frac{1}{3}$ inches long and $3\frac{1}{4}$ inches wide. Find its area in square inches.

ANSWER BANK

- S: $7\frac{1}{5}$ C: $\frac{27}{52}$ Y: $\frac{2}{3}$ D: $2\frac{1}{2}$ H: $\frac{1}{16}$ U: 36
- L: $\frac{1}{20}$ D: $1\frac{1}{2}$ A: $\frac{4}{25}$ D: $\frac{1}{32}$ E: $\frac{3}{16}$ R: $\frac{15}{16}$
- R: 1 K: $\frac{36}{49}$ M: $\frac{5}{7}$ H: $\frac{25}{56}$ A: $\frac{3}{40}$ E: $\frac{19}{27}$
- S: $17\frac{1}{3}$ T: 6 I: 10 A: $2\frac{4}{7}$

DECODER | Read across both rows

2	15		6	18	10	21	1	13	9					
	8	20	5		14	12	16	4	22	11	17	3	19	7