

LCM Strips and GCF Cards

Purpose

Students will find the least common multiple and the greatest common factor of whole numbers and use them to solve problems with fractions.

Materials

For the teacher: hole punch, chalk, chalkboard, enlarged cardstock copy of Black Line Master (BLM) *Multiplication Table*, extra 4" × 6" blank index cards for corrections

For each student: enlarged cardstock copy of BLM *Multiplication Table*, scissors, 2 brads or pieces of yarn, 21 4" × 6" blank index cards, scrap paper, copy of BLM *Using LCM and GCF With Fractions*

Activity

A. Pre-Activity Preparation

Punch a hole in the upper left hand corner of each of the index cards and in the spots marked on the enlarged copies of the BLM.

B. Introduction

1. Review the terms *multiple* and *factor*.
2. Write " $\frac{3}{8} + \frac{5}{6}$ " on the chalkboard and ask students how they would find the solution to the addition sentence. Have a student work the problem on the chalkboard.
3. Explain that to find a common denominator for the fractions, multiples of 8 and 6 must be found until a common multiple is found. Explain that the preferred multiple is the smallest or *least common multiple* or LCM (e.g., while 48 is a common multiple, 24 is the least common multiple).
4. Ask students why it might be best to find the least common multiple. Compare answers using 24 as the denominator and using 48 as the denominator for the addition sentence. Explain that using the least common multiple often produces an answer in simplest terms.
5. Write " $\frac{1}{6} + \frac{1}{2}$ " on the chalkboard. Ask students to determine the least common multiple of 6 and 2. Tell students to find the solution to the addition sentence using the least common multiple of 6 and 2 for the common denominator.
6. Work the problem on the chalkboard leaving the answer in the form " $\frac{4}{6}$." Tell students that the answer is not in the simplest terms even though the least common multiple was used. Ask students how they might find the simplest terms.

(continued)



INCORPORATING **TECHNOLOGY**

Allow students to use calculators to find the factors of each number for the GCF cards. Have students explore the LCMs of larger numbers by finding multiples with a calculator.



MEETING INDIVIDUAL **NEEDS**

Have students who are having difficulty finding factors of numbers use square tiles. Have them use the same number of tiles as the number for which they are finding factors (e.g., factors for 12 can be found by using 12 tiles). Tell them to arrange the tiles in rectangles. Factors can be found by counting the number of tiles on each side.

Standards Links **6.2.2, 6.7.5**

Activity (continued)

7. Explain that dividing 4 and 6 by the largest or *greatest common factor*, abbreviated as GCF, will produce the simplest terms of the fraction.
8. Tell students that they will be preparing some tools to help them find least common multiples and greatest common factors.


C. Student Activity

1. Give an enlarged cardstock copy of the BLM *Multiplication Table* to each student. Discuss the meaning of the numbers on the BLM. Demonstrate how to cut the table into strips. Have students connect the strips by placing a brad or tying yarn in the hole punched in each strip.
2. Give each student 20 4" × 6" index cards with holes punched in the upper left corner. Instruct students to label one of the cards "GCF Cards" for a cover and another card "Prime Numbers." Tell them that they will be writing all the prime numbers between 1 and 30 (inclusively) on one card. Tell students to write every other number separately on an individual card and include all factors of each numbers on its card. Tell them to use scrap paper to find the primes and factors before writing them on the cards.
3. Have students connect the GCF cards by placing a brad or tying yarn in the holes punched in each index card. Compare answers to verify that students have all correct factors and prime numbers.
4. Hand out the BLM *Using LCM and GCF*. Tell students that they can use the LCM strips and GCF cards to help them complete the BLM.


Classroom Assessment

Basic Concepts and Processes


Throughout the activity and as students complete the BLM, ask the following questions:

 What is the least common multiple of 15 and 6?

 How did you determine your answer?

 What is the greatest common factor of 24 and 16?

 How did you determine your answer?

 How might you find the greatest common factor of 126 and 70?

Multiplication Table

●	LCM STRIPS											
●	2	4	6	8	10	12	14	16	18	20	22	24
●	3	6	9	12	15	18	21	24	27	30	33	36
●	4	8	12	16	20	24	28	32	36	40	44	48
●	5	10	15	20	25	30	35	40	45	50	55	60
●	6	12	18	24	30	36	42	48	54	60	66	72
●	7	14	21	28	35	42	49	56	63	70	77	84
●	8	16	24	32	40	48	56	64	72	80	88	96
●	9	18	27	36	45	54	63	72	81	90	99	108
●	10	20	30	40	50	60	70	80	90	100	110	120
●	11	22	33	44	55	66	77	88	99	110	121	132
●	12	24	36	48	60	72	84	96	108	120	132	144

Multiplication Table

Teacher Directions

Make enlarged copies of the BLM onto cardstock. Punch holes in the black circles in the first column of the table.

Give each student one of the enlarged copies after the introduction portion of the activity. Have students cut the table into horizontal strips so that each strip begins with the punched hole and continues with multiples of the first number. Instruct students to place the strip labeled “LCM STRIPS” on top and connect the strips by placing a brad or tying yarn in the holes. Allow students to use the LCM strips to complete the BLM *Using LCM and GCF With Fractions*.

Answer Key

Not applicable.

Using LCM and GCF With Fractions

Solve the fraction problems below by finding the LCM for the common denominators. When necessary, divide both the numerator and the denominator of the solution by the GCF to express the solution in the simplest terms. Show your work.

1. $\frac{4}{15} + \frac{1}{9}$

2. $3\frac{7}{12} - 1\frac{1}{8}$

3. $7\frac{5}{12} + 3\frac{1}{3}$

4. $5\frac{1}{2} - 2\frac{5}{14}$

Divide both the numerator and the denominator of the fractions below by their GCF to express the fraction in the simplest terms. Show your work.

5. $\frac{16}{24}$

6. $\frac{15}{60}$

7. $4\frac{72}{90}$

8. $\frac{39}{91}$

Solve the problem below by using the LCM and GCF. Express your answer in simplest terms.

9. Mrs. Geraldo made cookies for the neighborhood children. She told Miguel, Pedro, and Angela to take some of the cookies home with them. Miguel took $\frac{1}{2}$ of the cookies home and Pedro took home $\frac{2}{9}$ of the cookies. What fraction of the cookies did the boys take altogether?

10. If Mrs. Geraldo made 36 cookies, how many cookies did Angela have left to take home?

Using LCM and GCF With Fractions

Teacher Directions

Distribute one copy of the BLM *Using LCM and GCF With Fractions* to each student. After students have created the LCM strips and GCF cards, allow them to use them as they complete the BLM. Tell students to solve the fraction problems and express answers in simplest terms by finding the LCMs and GCFs as needed.

Answer Key

$$1. \quad \begin{aligned} \frac{4}{15} + \frac{1}{9} &= \\ \frac{12}{45} + \frac{5}{45} &= \\ \frac{17}{45} & \end{aligned}$$

$$2. \quad \begin{aligned} 3 \frac{7}{12} - 1 \frac{1}{8} &= & \text{OR} & \quad \frac{43}{12} - \frac{9}{8} = \\ 3 \frac{14}{24} - 1 \frac{3}{24} &= & & \quad \frac{86}{24} - \frac{27}{24} = \\ \mathbf{2 \frac{11}{24}} & & & \quad \frac{59}{24} = \\ & & & \quad \mathbf{2 \frac{11}{24}} \end{aligned}$$

$$3. \quad \begin{aligned} 7 \frac{5}{12} + 3 \frac{1}{3} &= & \text{OR} & \quad \frac{89}{12} + \frac{10}{3} = \\ 7 \frac{5}{12} + 3 \frac{4}{12} &= & & \quad \frac{89}{12} + \frac{40}{12} = \\ \frac{10 \frac{9}{12}}{10 \frac{3}{4}} &= & & \quad \frac{129}{12} = \\ & & & \quad \mathbf{10 \frac{3}{4}} \end{aligned}$$

$$4. \quad \begin{aligned} 5 \frac{1}{2} - 2 \frac{5}{14} &= & \text{OR} & \quad \frac{11}{2} - \frac{33}{14} = \\ 5 \frac{7}{14} - 2 \frac{5}{14} &= & & \quad \frac{77}{14} - \frac{33}{14} = \\ \frac{3 \frac{2}{14}}{3 \frac{1}{7}} &= & & \quad \frac{44}{14} = \\ & & & \quad 3 \frac{2}{14} \text{ (or } \frac{22}{7}) = \\ & & & \quad \mathbf{3 \frac{1}{7}} \end{aligned}$$

$$5. \quad \begin{aligned} \text{GCF} &= 8 \\ \frac{16}{24} &= \frac{2}{3} \end{aligned} \qquad 6. \quad \begin{aligned} \text{GCF} &= 15 \\ \frac{15}{60} &= \frac{1}{4} \end{aligned}$$

$$7. \quad \begin{aligned} \text{GCF} &= 18 \\ \frac{72}{90} &= \frac{4}{5} \end{aligned} \qquad 8. \quad \begin{aligned} \text{GCF} &= 13 \\ \frac{39}{91} &= \frac{3}{7} \end{aligned}$$

$$9. \quad \begin{aligned} \frac{1}{2} + \frac{2}{9} &= \\ \frac{9}{18} + \frac{4}{18} &= \\ \frac{13}{18} & \end{aligned} \qquad 10. \quad \begin{aligned} \frac{18}{18} - \frac{13}{18} &= \\ \frac{5}{18} & \\ \frac{5}{18} \times \frac{36}{1} &= \\ \frac{180}{18} &= \\ \mathbf{10 \text{ cookies}} & \end{aligned}$$