HIGHEST COMMON FACTOR AND LOWEST COMMON MULTIPLE

BUILDING BLOCKS

NAME _____ CLASS _____ DATE _____

KEY IDEA

Factors of 8: **1, 2, 4, 8**

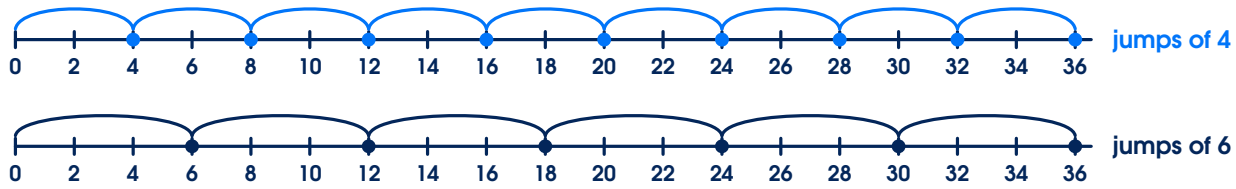
Factors of 12: **1, 2, 3, 4, 6, 12**

HCF = highest common factor

The HCF of 8 and 12 is 4.

LCM = lowest common multiple: the first number in both times tables.

1 One frog jumps in 4s. Another frog jumps in 6s. Both start at 0.



a) Where do both land? ____, ____, ____ **b)** LCM of 4 and 6 = ____

2 a) Circle the factors that are in both lists.

Factors of 12: 1 2 3 4 6 12

Factors of 18: 1 2 3 6 9 18

b) The highest common factor (HCF) of 12 and 18 is ____

3 Find the LCM of 3 and 5.

Multiples of 3: **3, 6,** ____, ____, ____, ____

Multiples of 5: **5, 10,** ____, ____, ____, ____

The first number in both lists is the LCM of 3 and 5: ____

4 Pens come in packs of 4. Pencils come in packs of 6. Ella wants equal numbers of each.



4 pens



6 pencils

a) What is the smallest number of pens and of pencils she can have? ____

b) How many packs of pens? ____ **c)** How many packs of pencils? ____

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SUPPORT

NAME _____ CLASS _____ DATE _____

KEY IDEA

HCF: list the factors of each number. Find the biggest one in both lists.

LCM: list the multiples of each number. Find the smallest one in both lists.

6 and 8: factors 1, 2, 3, 6 and 1, 2, 4, 8 → HCF = 2 multiples 6, 12, 18, 24 and 8, 16, 24 → LCM = 24

1 Find the HCF of 16 and 24.

Factors of 16: **1, 2, ☐, ☐, 16**

Factors of 24: **1, 2, 3, ☐, 6, ☐, 12, 24**

HCF of 16 and 24 = ☐

2 Find the LCM of 6 and 9.

Multiples of 6: **6,** ☐, ☐, ☐, ☐

Multiples of 9: **9,** ☐, ☐, ☐, ☐

LCM of 6 and 9 = ☐

3 Find the HCF and the LCM of each pair of numbers.

NUMBERS	HCF	LCM
10 and 15		
9 and 12		
4 and 7		

4 Bus A leaves every 14 minutes. Bus B leaves every 21 minutes. Both leave at 9:00 am.

a) Do you need the HCF or the LCM? Circle: HCF LCM

b) Work it out for 14 and 21: ☐ minutes

c) What time do they next leave together? ☐

HIGHEST COMMON FACTOR AND LOWEST COMMON MULTIPLE

CORE

NAME _____ CLASS _____ DATE _____

KEY IDEA

The HCF can never be bigger than the smaller number; the LCM can never be smaller than the larger number. In context: splitting into the largest equal groups uses the HCF; things happening together again, or the smallest amount that works, uses the LCM.

FLUENCY

1 Find the HCF and the LCM of each pair of numbers.

a) 18 and 24 HCF ☐ LCM ☐

b) 20 and 30 HCF ☐ LCM ☐

c) 7 and 9 HCF ☐ LCM ☐

d) 14 and 42 HCF ☐ LCM ☐

2 Find:

a) The HCF of 12, 18 and 30 ☐

b) The LCM of 4, 6 and 10 ☐

REASONING

3 Sam says, "The LCM of 6 and 8 is 48, because 6 × 8 = 48." Is Sam right? Explain.

.....

.....

4 Decide whether you need the HCF or the LCM, then answer.

a) 36 sweets and 24 balloons are shared equally into party bags, with nothing left over. What is the greatest number of bags that can be made? ☐

b) A wall 60 cm by 45 cm is covered with identical square tiles with no gaps or cutting. What is the largest possible side length of a tile? ☐

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GREATER DEPTH

NAME _____ CLASS _____ DATE _____

REASONING

1 Is each statement always, sometimes or never true? Circle your answer.

If it is sometimes true, give an example of when it is true and when it is not.

a) The LCM of two numbers is their product. ALWAYS SOMETIMES NEVER

b) The HCF of two numbers is less than both. ALWAYS SOMETIMES NEVER

c) HCF × LCM = the product of the two numbers. ALWAYS SOMETIMES NEVER

d) The LCM of two different primes is their product. ALWAYS SOMETIMES NEVER

PROBLEM SOLVING

2 Two two-digit numbers have an HCF of 6 and an LCM of 72. Find the two numbers.

The numbers are ☐ **and** ☐

3 Three fountains spray every 8 seconds, 18 seconds and 30 seconds. They all spray together at noon.

a) At what time do they next all spray together? ☐

b) How many times do they spray together in the hour after noon? ☐

★ CHALLENGE FOR ALL

4 HCF and LCM work with letters too.

Two terms: $18a^2b$ and $24ab^2$

a) Find the HCF of the two terms. ☐

b) Find the LCM of the two terms. ☐

HIGHEST COMMON FACTOR AND LOWEST COMMON MULTIPLE

ANSWERS

BUILDING BLOCKS

1 a) 12, 24, 36 · b) 12

2 a) 1, 2, 3, 6 · b) 6

3 3: 9, 12, 15, 18, 21, 24 · 5: 15, 20, 25, 30, 35, 40 · LCM = 15

4 a) 12 · b) 3 · c) 2

SUPPORT

1 16: 4, 8 · 24: 4, 8 · HCF = 8

2 6: 12, 18, 24, 30 · 9: 18, 27, 36, 45 · LCM = 18

3 10 and 15: HCF 5, LCM 30 · 9 and 12: HCF 3, LCM 36 · 4 and 7: HCF 1, LCM 28

4 a) LCM · b) 42 minutes · c) 9:42 am

CORE

1 a) HCF 6, LCM 72 · b) HCF 10, LCM 60 · c) HCF 1, LCM 63 · d) HCF 14, LCM 42

2 a) 6 · b) 60

3 No. 48 is a common multiple but not the lowest: 24 is a multiple of both 6 and 8.

4 a) HCF: 12 bags · b) HCF: 15 cm

GREATER DEPTH

1 a) sometimes: 4 and 5 → 20, but 4 and 6 → 12 · b) sometimes: HCF(4, 6) = 2, but HCF(5, 10) = 5 · c) always · d) always

2 18 and 24 (6 × 3 and 6 × 4; 6 and 72 has a one-digit number)

3 a) LCM = 360 s = 6 minutes, so 12:06 pm · b) 10 times

4 a) $6ab$ · b) $72a^2b^2$