

Factors multiples and primes

Pearson Edexcel GCSE Mathematics 1MA1 • L005
Foundation and Higher • 60 minutes • Lesson resources

REACH FOR THE STAR | GCSE MATHEMATICS

Find and justify factors, prime factorisations, HCFs and LCMs; choose the right structure for a problem.

Work without a calculator except where a check is invited. Write on the lines or replace them with typed answers. Attempt before reading intentional practice feedback.

Connect & Check

Factor: divides a whole number exactly. Multiple: an integer times a number. Prime: integer greater than 1 with exactly two positive factors. HCF: highest common factor. LCM: lowest common multiple.

R1

Calculate 6×7 and $42 \div 6$.

R2

Write 3^2 as a product.

R3

Which of 2, 9 and 11 are prime? Explain.

Share | In pairs, predict the first step for this problem: Factors come in pairs: $18 = 1 \times 18 = 2 \times 9 = 3 \times 6$. After pairs cross, no new factors appear. A prime factorisation splits until every factor is prime; $18 = 2 \times 3 \times 3$. Different va Compare your reasons before using the worked model.

Present through worked examples

Factors come in pairs: $18 = 1 \times 18 = 2 \times 9 = 3 \times 6$. After pairs cross, no new factors appear. A prime factorisation splits until every factor is prime; $18 = 2 \times 3 \times 3$. Different valid splits give the same prime factors.

D1

Model: factors of 18 are 1, 2, 3, 6, 9, 18. List all positive factors of 20.

D2

Model: $18 = 2 \times 3^2$. Complete $24 = 2 \times 12 = 2 \times 2 \times 6 = \underline{\hspace{1cm}}$.

D3

Model: $12 = 2^2 \times 3$ and $18 = 2 \times 3^2$; $\text{HCF} = 2 \times 3 = 6$. Find HCF of 18 and 24.

D4

Model: LCM of 12 and 18 is $2^2 \times 3^2 = 36$. Find LCM of 8 and 12.

Apply with less support

List factors in pairs. For HCF select prime factors shared by both numbers, with the smaller powers. For LCM include every prime needed, with the larger powers. Check that HCF divides both and LCM is divisible by both.

A1

For 6 and 9, then 6 and 12, find both HCF and LCM. Explain what changes.

A2

Write 30 and 45 as products of primes. Find their HCF and LCM.

A3

Two lights flash every 12 seconds and 18 seconds. They flash together now. After how many seconds will they next flash together?

Optional support: List factors and multiples in separate columns.

Optional check after A2: $90 \div 30 = 3$ and $90 \div 45 = 2$. A calculator checks divisibility but does not establish that a multiple is the lowest.

Apply and extend reasoning

C1

Are two different prime numbers always coprime? Explain using factors.

C2

For 12 and 18, compare $\text{HCF} \times \text{LCM}$ with 12×18 . Explain using the prime powers.

Intentional practice feedback — read after attempting

A1: 3 and 18; 6 and 12.

A2: $30=2 \times 3 \times 5$; $45=3^2 \times 5$; HCF 15; LCM 90.

A3: 36 seconds.

C1: Yes. Their only shared positive factor is 1.

C2: $6 \times 36 = 216 = 12 \times 18$.

Correct one response and explain your change. Stretch is available to either tier; temporary support needs do not determine entry tier.

Recall & Review through retrieval

Work without notes. Six retrieval points; this attempt does not establish mastery. Equivalent exact numeric forms are accepted. Where accuracy is requested, also state the requested form in your written work.

Q1 HCF of 12 and 20

Q2 LCM of 6 and 8

Q3 Number of positive factors of 13

Q4 Missing prime: $30 = 2 \times 3 \times ?$

Q5 $-9 - (-4)$

Q6 0.46×100

Intentional retrieval feedback

Q1 4; Q2 24; Q3 2; Q4 5; Q5 -5 ; Q6 46. Correct and retry tomorrow, then in one week.

Prove independently and improve

P1–P2: five minutes without notes; 4 marks. Your teacher reviews explanations and method marks.
P3 has no mark.

P1

Find HCF of 20 and 30. Show the shared factors. [2]

P2

Find LCM of 4 and 10 and show that it is divisible by both. [2]

P3

Name one decision you can now explain. Set a fresh question and a date for checking it without support.

Teacher feedback: _____

Fresh question and retry date: _____

Delayed independent evidence: _____

Prepare for the next lesson

L006: Fractions and equivalent forms

F1

Tomorrow write 28 as a product of primes and find HCF of 14 and 21.

F2

Before L006, explain why $\frac{2}{3}$ and $\frac{4}{6}$ represent the same amount of the same whole.

Read and prepare

Multiplying or dividing the top and bottom of a fraction by the same non-zero number preserves its value. The whole stays fixed. We will use common factors to simplify.

Digital workbook: save locally where available; export a JSON backup before closing or moving the file. Restore only this lesson/version. Printing records answers, not mastery. Live browser checks remain pending; use Word/PDF if required.

Optional extension activities

Stretch

Find the HCF and LCM of 84 and 126 using prime factors.

Deep challenge

Two numbers have HCF 6, LCM 180 and one number 30. Find the other.

Recall & Review: feedback and extension integration

Lesson L005: Factors multiples and primes

Objective: Find and justify factors, prime factorisations, HCFs and LCMs; choose the right structure for a problem.

Timing for a 60-minute lesson

0-7 Connect & Check; 7-14 Share; 14-25 Present/model; 25-44 Apply route choice/practice; 44-52 independent exam-style check; 52-60 Recall & Review, WWW/EBI and next step.

Recall & Review evidence

At the end of the lesson, solve a fresh question without prompts, explain one check, correct one error and record the next practice step.

What Went Well (WWW)

I selected an efficient numerical method, showed the key steps clearly and checked the sign, size or accuracy of my answer.

Even Better If (EBI)

I will make the place-value, sign or operation decision explicit and use estimation or an inverse calculation to check a fresh question.

Integrated stretch and deep challenge

Stretch: Find the HCF and LCM of 84 and 126 using prime factors.

Deep challenge: Two numbers have HCF 6, LCM 180 and one number 30. Find the other.

My next-step response