

Prisms and cylinders · Teacher guide and answers

Pearson Edexcel GCSE Mathematics 1MA1 · L035 · Week 12 · 60 minute lesson

Teaching focus

Calculate prism and cylinder volumes from cross-sectional area and length.

Suggested 60 minute route: Recall 5, Discover 15, Apply 20, Challenge 15, Prove 5. When independent work is secure, use the optional stretch and deep challenge tasks in place of further scaffolded practice. Allow 10–15 minutes for this route. Reteach and use a fresh check for learners who need more time.

Access → Scaffold → Core → Stretch

Offer vocabulary and a worked example, then fade prompts. Use the challenge as the stretch route. Support needs do not determine tier.

Method and worked example

A prism has a constant cross-section. Volume is cross-sectional area multiplied by length.

A triangular prism has cross-section base 6 cm and height 4 cm, with length 10 cm. Find its volume.

Triangle area = 12 cm^2 , so volume = 120 cm^3 .

Answer key

Apply

A cylinder has radius 3 cm and height 8 cm. Give its volume exactly.

$$V = \pi \times 3^2 \times 8 = 72\pi \text{ cm}^3.$$

Challenge

A prism has volume 210 cm^3 and cross-section area 15 cm^2 . Find its length.

$$210 \div 15 = 14 \text{ cm.}$$

Extension activities

Stretch

A prism has a trapezium cross-section with parallel sides 4 cm and 8 cm and height 3 cm. Its length is 11 cm. Find the volume.

Cross-section = $(4+8) \times 3/2 = 18 \text{ cm}^2$; volume = 198 cm^3 .

Deep challenge

A cylinder and a triangular prism both have cross-sectional area 24 cm^2 and length 7 cm. Compare their volumes and explain.

Both volumes are $24 \times 7 = 168 \text{ cm}^3$; the cross-section shape does not change the prism rule.

Assessment decision

Review the learner's independent method. Reteach the first incorrect step, then use a fresh delayed question. Workbook completion alone does not establish mastery.

Specification references

R1 G12 G14 G16

Activate Learning lesson cycle

Connect & Check: state the objective and diagnose prior knowledge. Share: pairs predict and compare methods. Present: explain or uncover the model. Apply: fade support for independent practice and optional stretch. Recall & Review: use a fresh question and feedback to decide the next step.

Recall & Review: feedback and extension integration

Lesson L035: Prisms and cylinders

Objective: Calculate prism and cylinder volumes from cross-sectional area and length.

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 the correct geometric fact, theorem, formula or transformation and used a clear diagram with appropriate labels and units.

Even Better If (EBI)

I will name the fact or theorem, show the substitution or construction step and check whether the size, direction and units of the result are reasonable.

Integrated stretch and deep challenge

Stretch: A prism has a trapezium cross-section with parallel sides 4 cm and 8 cm and height 3 cm. Its length is 11 cm. Find the volume.

Deep challenge: A cylinder and a triangular prism both have cross-sectional area 24 cm^2 and length 7 cm. Compare their volumes and explain.

Teacher use

Use the What Went Well (WWW) and Even Better If (EBI) prompts to write mathematics-specific feedback linked to the objective. Do not accept generic praise: identify the method, representation, reasoning or checking step that improved, then set a fresh next-step question.

Assessment evidence to inspect: Check the formative mini-test and independent workbook response against the objective. Use the teacher answers or mark guidance; group errors for reteaching. NC/C selected to purpose; label each question.