

TEACHER GUIDE

Geometry that makes sense

Nets and surface area



Grade 6 • NC.6.G.4 • Geometry

Seven teaching sections • 30 choice items • 30 open/performance tasks

Includes models, blank construction workspaces, worked solutions, observation records, and accessible teaching routines.

Current North Carolina alignment for 2026–27. The newly adopted 2026 standards begin in 2028–29 and are not substituted here.

Free sample | Contents

NC.6.G.4 | Sixth Grade mathematics

This sample contains 10 complete selected pages from the 75-page resource, plus this sample contents page. Original printed page numbers are retained. Gaps are intentional.

Included original pages: 1-8, 44-45

Representative activities

M01: sample PDF page(s) 8; original page(s) 7

M02: sample PDF page(s) 9; original page(s) 8

O01: sample PDF page(s) 8; original page(s) 7

O02: sample PDF page(s) 9; original page(s) 8

Selected teacher prompts and keys: original page(s) 44-45

Using this sample

Read the preparation and access guidance before using a selected activity.
Keep teacher keys and private preparation pages separate from student copies.
Use the original resource contents to see the scope of the complete packet.

Complete paid download

The complete resource includes the full PDF task bank and teaching materials.

TEACHER GUIDE

Standard and learning targets

Represent right prisms and right pyramids using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

R • I can represent right prisms with rectangle/triangle nets and calculate surface area.

Y • I can represent right pyramids with rectangle/triangle nets and calculate surface area.

Essential question: How does a geometric representation make a measurement calculation convincing?

Evidence: collect the drawing/model, labelled dimensions and units, computation, and an explanation connecting the model to the answer. Choice answers alone cannot establish construction or modeling performance.

Mathematical practices: make sense of the situation, construct an argument, critique a partner's reasoning, model, and attend to precision. All contexts and dimensions in this packet are original instructional examples.

Scope: Right prisms and right square pyramids are represented by connected nets. Surface area includes every face of each closed solid. Slant height belongs to a triangular face.

TEACHER GUIDE

Plan, materials, and access

Print plan: pages 1–4 orient the teacher; page 5 is a reusable organizer. Seven section scripts and paired M/O student pages follow. Worked keys, evidence records, and sources finish the packet. Each M/O pair is on its own student page.

Use a selected core across 3–5 lessons of 25–35 minutes. Select one M and one O from a section, allow construction and discussion time, and revisit other items over later days. The 60-item bank is not a single test.

Prerequisites: multiplication, fractions, length versus area, ordered pairs and whole-number geometric measurement. Check these before interpreting errors as new-learning difficulties.

Materials: pencil, ruler, colored pencils, scrap/card paper, grid pages, and optional large cubes. For nets, adult-prepared cut paper and removable tape are optional. Adults handle cutting; do not require blades or tiny pieces.

Access: neutral read-aloud, enlarged grids, tactile outlines, AAC, oral explanation, or a scribe following the learner's exact construction directions. Do not preplot vertices, supply decomposition lines, choose the formula, or name missing faces during an independent check. Record any answer-supplying cue separately.

Language: connect face/base/height to the drawing. A face altitude is perpendicular to its base. Invite gestures and home-language explanations; score mathematics, not handwriting or accent.

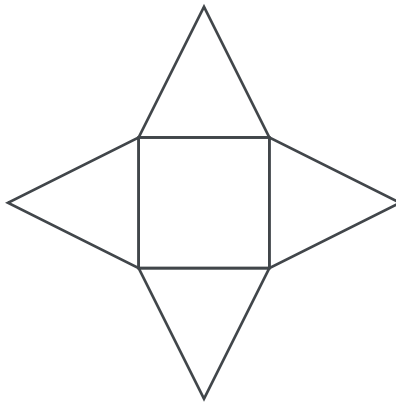
Support/extension: reduce the number of dimensions while preserving the target; then return to the original. Extend by proposing a second valid model and explaining why it yields the same measurement.

TEACHER MODEL

Think aloud with a model

A closed right square pyramid has base side 4 cm. Each triangular face has slant height 4 cm (the face altitude, not the vertical height). Draw a connected net, label every face dimension, and mark fold edges. Find the area of each face and the total surface area. Explain which edges meet when folded. Use the whole closed solid, including the base(s).

Say: “First I identify what the units measure. I will represent the whole figure, label the given information, and choose pieces or intervals that I can justify.”



Model diagram; use the stated dimensions. Printed lengths are not measurement units.

Net: one 4×4 square and four congruent triangles, each with base 4 and face altitude 4. Each triangle has area $4 \times 4/2 = 8 \text{ cm}^2$. Total = $16 + 4(8) = 48 \text{ cm}^2$. The triangles attach one per square edge; their equal side lengths meet at the apex. Since slant height 4 exceeds half the base 2, the pyramid has a positive vertical height.

Ask: “Which part of the model accounts for each factor or term? How do I know I have neither left a gap nor counted part twice?” Show a deliberate error in units and invite a correction. Keep this teacher page separate from independent student pages.

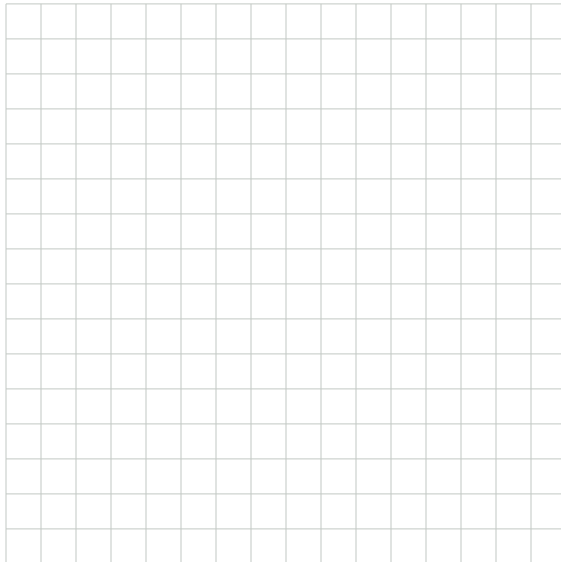
REUSABLE STUDENT ORGANIZER

Represent • compute • explain

Name: _____ Date: _____ Item: _____

Given dimensions / coordinates and what I need to find:

My labelled model (include units and any cuts, layers, faces, or axes):



Equations, reasoning, and a check:

TEACHER SCRIPT

Warm-up

Bank: M01–M04 and O01–O04. Suggested core: M01, O01; use other tasks in later sessions.

Purpose: Elicit the prerequisite idea and the learner’s unit interpretation.

0–3 minutes • Say: “What are we finding, and what do the units mean? Point to the information we know. Tell me what still needs to be represented.” Ask students to sketch before calculating.

3–10 minutes • Students construct or draw the selected O model. Ask: “Where is each dimension shown? Why does this cut, layer, face, or interval belong?” Do not supply the missing mathematical step during independent evidence.

10–18 minutes • Compare two representations. Say: “Trace the entire boundary or solid. Check for a gap, overlap, missing face, or counted endpoint. Explain how the equation follows from your representation.” Use the selected M item as a diagnostic discussion, not a proxy for the drawing.

18–25 minutes • Each learner explains one decision independently and checks units. Record model accuracy, reasoning, computation, and support. Adjust time for physical construction; finish next session when needed.

Listen/look for: Represent right pyramids with rectangle/triangle nets and calculate surface area.

If stuck: Trace each face of a physical model. Match a flat face to a net face before calculating. Distinguish slant height from vertical height.

Early finish: create a different valid representation and explain equivalence. For collaboration, retain each learner’s initial model and final explanation so a partner’s work does not replace individual evidence.

WARM-UP

M01 and O01 • Student work

Name: _____ Date: _____

M01 • A closed right square pyramid has base side 4 cm. Each triangular face has slant height 4 cm (the face altitude, not the vertical height). What is the surface area, with no overlaps, tabs, or waste?

A. 48 cm^2

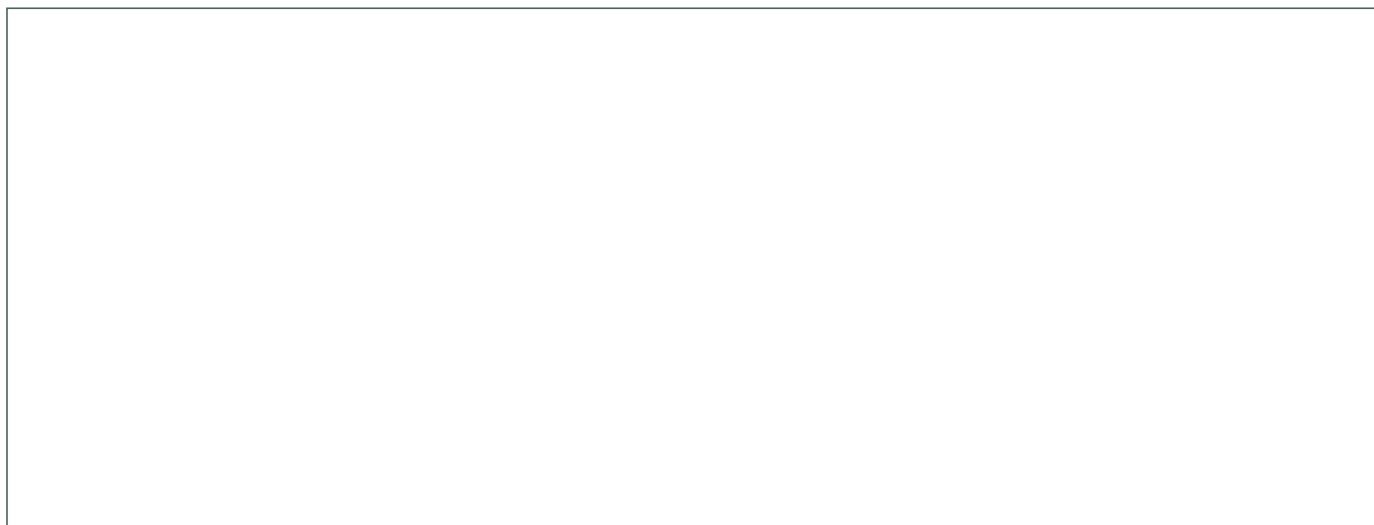
B. 36 cm^2

C. 24 cm^2

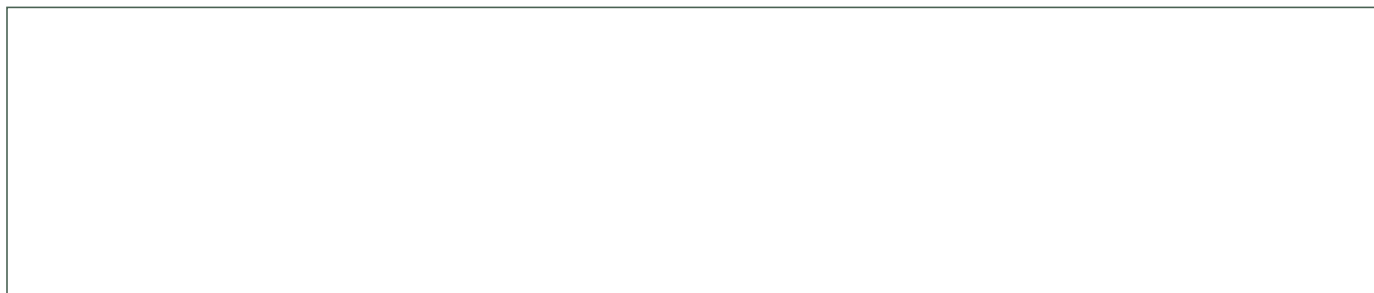
D. 12 cm^2

O01 • A closed right square pyramid has base side 4 cm. Each triangular face has slant height 4 cm (the face altitude, not the vertical height). Draw a connected net, label every face dimension, and mark fold edges. Find the area of each face and the total surface area. Explain which edges meet when folded. Use the whole closed solid, including the base(s).

Model / construction space (continue on the reusable organizer if needed):



Equations, units, and explanation:



WARM-UP

M02 and O02 • Student work

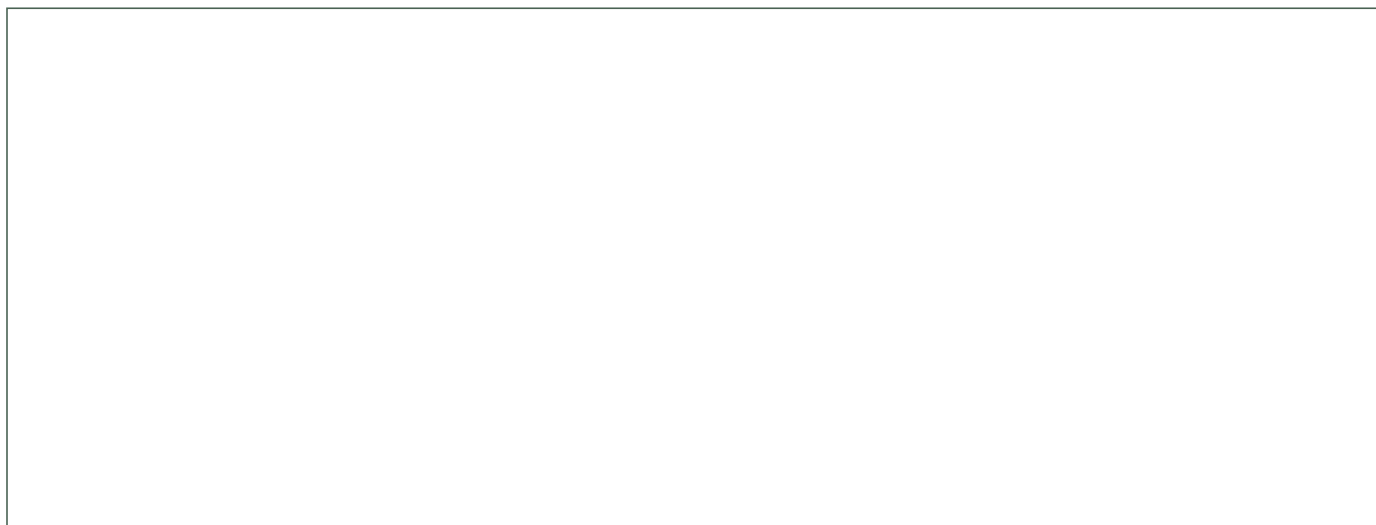
Name: _____ Date: _____

M02 • A closed right square pyramid has base side 6 cm. Each triangular face has slant height 6 cm (the face altitude, not the vertical height). What is the surface area, with no overlaps, tabs, or waste?

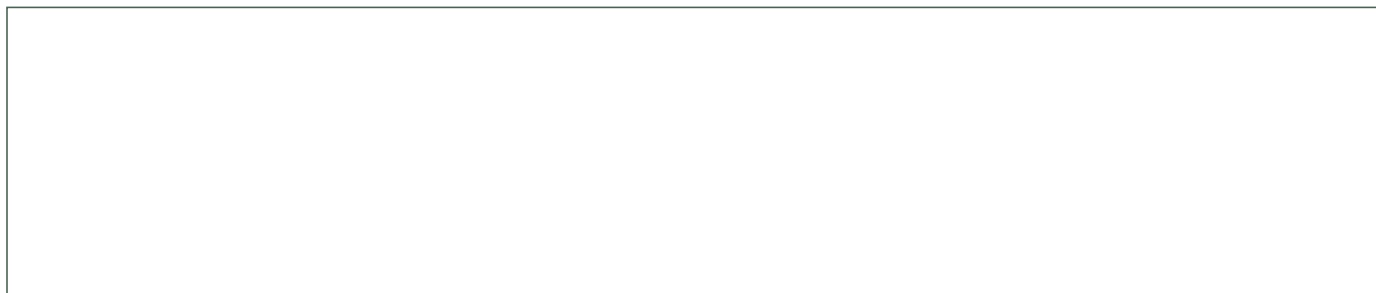
A. 162 cm^2 B. 108 cm^2 C. 135 cm^2 D. 189 cm^2

O02 • A closed right square pyramid has base side 6 cm. Each triangular face has slant height 6 cm (the face altitude, not the vertical height). Draw a connected net, label every face dimension, and mark fold edges. Find the area of each face and the total surface area. Explain which edges meet when folded. Use the whole closed solid, including the base(s).

Model / construction space (continue on the reusable organizer if needed):



Equations, units, and explanation:



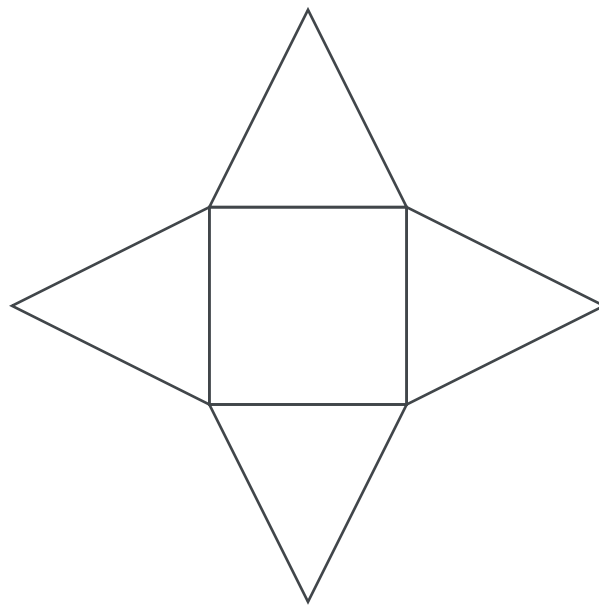
TEACHER KEY

M01 / O01 • Worked model

Target Y: Represent right pyramids with rectangle/triangle nets and calculate surface area.

M01: A. 48 cm²

O sample solution: Net: one 4×4 square and four congruent triangles, each with base 4 and face altitude 4. Each triangle has area $4 \times 4/2 = 8 \text{ cm}^2$. Total = $16 + 4(8) = 48 \text{ cm}^2$. The triangles attach one per square edge; their equal side lengths meet at the apex. Since slant height 4 exceeds half the base 2, the pyramid has a positive vertical height.



Model diagram; use the stated dimensions. Printed lengths are not measurement units.

Check the actual performance: All faces are connected by full matching edges. Folded faces cover the closed solid once; no face is missing or repeated. Total area includes each face exactly once.

Alternate valid representations are welcome. A correct numerical answer with an absent or incompatible model is incomplete evidence for the construction/modeling target.

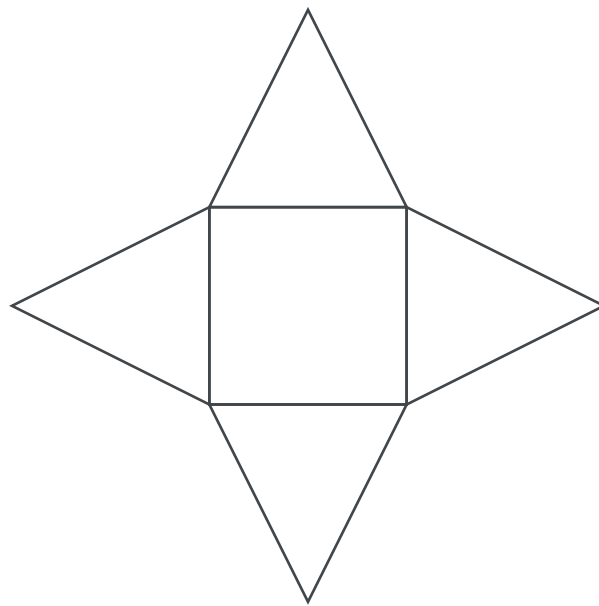
TEACHER KEY

M02 / O02 • Worked model

Target Y: Represent right pyramids with rectangle/triangle nets and calculate surface area.

M02: B. 108 cm²

O sample solution: Net: one 6×6 square and four congruent triangles, each with base 6 and face altitude 6. Each triangle has area $6 \times 6/2 = 18 \text{ cm}^2$. Total = $36 + 4(18) = 108 \text{ cm}^2$. The triangles attach one per square edge; their equal side lengths meet at the apex. Since slant height 6 exceeds half the base 3, the pyramid has a positive vertical height.



Model diagram; use the stated dimensions. Printed lengths are not measurement units.

Check the actual performance: All faces are connected by full matching edges. Folded faces cover the closed solid once; no face is missing or repeated. Total area includes each face exactly once.

Alternate valid representations are welcome. A correct numerical answer with an absent or incompatible model is incomplete evidence for the construction/modeling target.