Mathematics: Grade 6

Overview

In the domain of *Geometry and Measurement*, grade six students apply the sums of interior angles of triangles and quadrilaterals to solve real-world problems,[6.GM.2] which builds on the work with triangles and other polygons in grades four and five.[4.G.2;5.G.1] Grade five students also also convert between different-sized measurement units within a system,[5.M.1] while grade six students convert between different measurement systems.[6.GM.1]

Students begin learning about area in grade three,[3.M.5] and they apply formulas for area and perimeter of rectangles in grade four.[4.M.4] By grade six, they are finding areas of complex shapes[6.GM.3] and in grade seven students understand the formulas for finding the area and circumference of a circle.[7.GM.2] Grade six students also find volumes of rectangular prisms,[6.GM.4] which extends to cylinders in grade seven[7.GM.3] and spheres, cones, and pyramids in grade eight.[8.GM.2]

<table>
<tr><th colspan="2">Geometry and Measurement</th></tr>
<tr><td>Learning Outcome</td><td>Students find areas of complex shapes and find volumes of rectangular prisms.</td></tr>
<tr><td>Standard</td><td>6.GM.3: Find the area of complex shapes composed of polygons by composing or decomposing into simple shapes; apply this technique to solve real-world and other mathematical problems.</td></tr>
<tr><th colspan="2">Evidence Statements</th><th>Academic Vocabulary</th></tr>
<tr><td colspan="2">Model how to decompose complex shapes into triangles, parallelograms and/or trapezoids.
Using the area formula for parallelograms (A=bh) and/or the area formula for trapezoids (A=1/2h(b₁ + b₂)), and/or triangles (A = 1/2bh), find the area of the decomposed complex shapes.
Solve real-world and other mathematical problems using this technique. Justify solutions using models of deconstructed complex shapes.</td><td>Compose
Decompose
Complex shape
Area
Parallelogram
Triangle
Trapezoid</td></tr>
<tr><th colspan="2">Clarification Statements</th><th>Common Misconceptions</th></tr>
<tr><td colspan="2">Thus far, students have developed the concepts of area for triangles, parallelograms, and trapezoids. Students have also found the area of complex shapes by decomposing them into parallelograms. This standard builds upon</td><td>Students may believe that the orientation of a shape changes the dimensions or composition of the shape.
Students may have difficulty recognizing common shapes within a complex shape.</td></tr>
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that foundational learning by requiring students to find the area of more complex shapes composed of polygons. These polygons are generally restricted to parallelograms and triangles. Trapezoids may also be given; however, they may also be decomposed into parallelograms and triangles instead of using the trapezoid formula.
- Students should not only have frequent experiences decomposing and finding the areas of real-world shapes such as floor plans, but they should also work to decompose and find the areas of rhombi, kites, and irregular shapes composed of parallelograms and triangles.
- Teachers may model decomposing shapes on regular paper, dot paper, geoboards, using cut-out shapes, or manipulating virtual tools.
- Grade six integrated STEM Standards 6.CC.2 and 6.AM.3 integrate well with this standard.

Looking Back	Looking Ahead
5.M.2: Find the area of a rectangle with fractional side lengths by modeling with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.	**7.GM.2:** Understand the formulas for area and circumference of a circle and use them to solve real-world and other mathematical problems; give an informal derivation of the relationship between circumference and area of a circle.
5.M.3: Develop and use formulas for the area of triangles, parallelograms, and trapezoids. Solve real-world and other mathematical problems that involve perimeter and area of triangles, parallelograms, and trapezoids, using appropriate units for measures. (E)	

Instructional Resources

- Mathematics Grades 5-6 Vertical Articulation Guide
- Mathematics Grades 6-8 Vertical Articulation Guide
- Learning Progressions & Content Supports: Grade 6 through Grade 8
- Implementing the Mathematical Process Standards: Grades Six through Eight
- Illustrative Mathematics-Areas of Special Quadrilaterals
- Illustrative Mathematics-Finding Areas of Polygons
- Illustrative Mathematics-Polygons in the Coordinate Plane
- Illustrative Mathematics-Wallpaper Decomposition

- NCTM Illuminations-Area Contractor Activity
- Inside Mathematics-Polly Gone
- GeoGebra-Composite Figure Template
- NCTM Illuminations-Isometric Drawing Tool
- Composite Figures Thinking Task
- Open Up Resources-Area and Surface Area: Lessons 2-3, 9
- Open Middle: Area of a House

Universal Supports for All Learners

- 2024 Content Connectors
- Universal Design for Learning Playbook
- UDL Guideline Infographic, from Learning Designed
- UDL Tips from CAST
- Mathematics Learning Recovery Series: Part 2-Addressing the Gaps in Student Learning
- Mathematics Learning Recovery Series: Part 3-Instructional Strategies for All Learners

Instructional Strategies

- What Works Clearinghouse-Concrete-Semi-Concrete-Abstract Video (Print Recommendations)
- What Works Clearinghouse-Clear & Concise Mathematical Language Video (Print Recommendations)
- NYSED-Frayer Vocabulary Model Scaffolding Example & Template
- Magma Math: Math Teaching Practices
- Problem Solving Instructional Support
- WIDA-Doing and Talking Mathematics: A Teachers Guide to Meaning-Making with English Learners
- Virginia Department of Education Students with Disabilities in Mathematics Frequently Asked Questions

Assessment Considerations

- ILEARN Test Blueprint: Mathematics 2025-2026 (Spreadsheet)
- ILEARN Test Blueprint: Mathematics 2025-2026 (PDF)
- IDOE Released Items Repository
- I AM - Indiana's Alternate Measure
- Quality Mathematic Items for Classroom Assessments (Featuring New ILEARN Item Specifications)
- Grade 6 ILEARN Math Desmos 4-Function Calculator
- UDL Assessment Strategies

Interdisciplinary Connections

Coming Soon

Disciplinary Literacy

Coming Soon

Contact IDOE's Office of Teaching and Learning with any questions.