| Apply geometric concepts in modeling situations. (Standards G.MG.1-3) |
|---|
| **Standard G.MG.1:** Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder). ★ |
| Concepts and Skills to Master |
| Use the modeling process to: <ul><li>Using a real world context, identify the characteristic to be modeled.</li><li>Make simplifying assumptions of the object to highlight important attributes while ignoring nonessential features.</li><li>Model real world objects using mathematical shapes and their characteristics.</li><li>Use measures of appropriate two- and three-dimensional shapes to estimate the measures of complex objects taking into account any overlap that may occur.</li><li>Interpret mathematical results in the context of the situation.</li></ul> |

| Related Standards: Current Course | Related Standards: Future Courses |
|---|---|
| III.G.GMD.4, III.G.MG.2, III.G.MG.3 | P.G.GMD.2 |

Support for Teachers

| Critical Background Knowledge |
|---|
| <ul><li>Finding measures of two-dimensional and three-dimensional shapes (7.G.4, 7.G.6, 8.G.9, II.G.GMD.1, and II.G.GMD.3)</li><li>Use cross-sections to decompose three-dimensional objects (7.G.3)</li><li>Construct a mathematical model (I.SI.MP.4)</li></ul> |
| Academic Vocabulary |
|  |
| Resources |
| Curriculum Resources: http://www.uen.org/core/core.do?courseNum=5630#71646 |

| Apply geometric concepts in modeling situations. (Standards G.MG.1-3) | |
|---|---|
| **Standard III.G.MG.2:** Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot). ★ | |
| Concepts and Skills to Master | |
| <ul><li>Understand density as a ratio (quantity per area or quantity per volume)</li><li>Differentiate between area and volume densities, their units, and situations in which they are appropriate (e.g., area  density is ideal for measuring population density spread out over land, and the concentration of oxygen in the air is  best measured with volume density).</li></ul> | |
| Related Standards: Current Course | Related Standards: Future Courses |
| III.G.GMD.4, III.G.MG.1, III.G.MG.3 | P.G.GMD.2 |

Support for Teachers

| Critical Background Knowledge |
|---|
| <ul><li>Finding areas of two-dimensional figures and volumes of three-dimensional objects (7.G.4, 7.G.6, 8.G.9, II.G.GMD.1, and II.G.GMD.3)</li><li>Construct a mathematical model (I.SI.MP.4)</li></ul> |
| Academic Vocabulary |
| Density (quantity per area or quantity per volume) |
| Resources |
| Curriculum Resources: http://www.uen.org/core/core.do?courseNum=5630#71646 |

| Apply geometric concepts in modeling situations. (Standards G.MG.1-3) |
|---|

| **Standard III.G.MG.3:** Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios). ★ |
|---|

| Concepts and Skills to Master |
|---|
| • Solve various design problems using attributes and relationships of geometric objects. |

| Related Standards: Current Course | Related Standards: Future Courses |
|---|---|
| All standards (any problem that can be related to a geometric model relates to this standard) | All future standards in Precalculus and Calculus (any problem that can be related to a geometric model relates to this standard) |

Support for Teachers

| Critical Background Knowledge |
|---|
| All things geometry: <br> • Draw, construct, and describe geometric figures and describe the relationships between them (7.G.1-3) <br> • Solve real-life and mathematical problems involving angle measure, area, surface area, and volume (7.G.4-6) <br> • Understand congruence (8.G.1-5 and I.G.CO.1-8) and similarity (8.G.1-5 and II.G.SRT.1-5) <br> • Understand and apply the Pythagorean Theorem (8.G.6-8) and properties of right triangles (II.G.SRT.6-11) <br> • Solve real world and mathematical problems involving volume of cylinders, cones, and spheres (8.G.9) <br> • Make geometric constructions (I.G.CO.12-13) <br> • Use coordinates to prove simple geometric theorems algebraically (I.G.GPE.4-7) <br> • Know theorems about lines, angles, triangles, parallelograms (II.G.CO.9-11) <br> • Understand and apply theorems about circles (II.G.C.1-5) <br> • Use volume formulas and 3-D objects to solve problems (II.G.GMD.1, 3, 4) |

| Academic Vocabulary |
|---|
| maximize, minimize, optimize, constraints, |

| Resources |
|---|
| Curriculum Resources: http://www.uen.org/core/core.do?courseNum=5630#71646 |