Arkansas Tutorials are designed specifically for the Arkansas Standards found in the Curriculum Framework documents to prepare students for the ACT Aspire in English, reading, writing, math and science tests.

Math Tutorials offer targeted instruction, practice and review designed to develop computational fluency, deepen conceptual understanding, and apply mathematical practices. They automatically identify and address learning gaps down to elementary-level content, using adaptive remediation to bring students to grade-level no matter where they start. Students engage with the content in an interactive, feedback-rich environment as they progress through standards-aligned modules. By constantly honing the ability to apply their knowledge in abstract and real world scenarios, students build the depth of knowledge and higher order skills required to demonstrate their mastery when put to the test.

In each module, the Learn It and Try It make complex ideas accessible to students through focused content, modeled logic and process, multi-modal representations, and personalized feedback as students reason through increasingly challenging problems. The Review It offers a high impact summary of key concepts and relates those concepts to students' lives. The Test It assesses students' mastery of the module's concepts, providing granular performance data to students and teachers after each attempt. To help students focus on the content most relevant to them, unit-level pretests and posttests can quickly identify where students are strong and where they're still learning.

1. INTRODUCTION TO GEOMETRY

- **POINTS, RAYS, LINE SEGMENTS, LINES, AND FIGURES**
  - **HSG.CO.A.1** *Based on the undefined notions of point, line, plane, distance along a line, and distance around a circular arc, define: angle, line segment, circle, perpendicular lines, parallel lines.*
  - **HSG.MG.A.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).*

- **PARALLEL AND PERPENDICULAR LINES**
  - **HSG.CO.A.1** *Based on the undefined notions of point, line, plane, distance along a line, and distance around a circular arc, define: angle, line segment, circle, perpendicular lines, parallel lines.*
  - **HSG.GPE.B.5** *Prove the slope criteria for parallel and perpendicular lines. Use the slope criteria for parallel and perpendicular lines to solve geometric problems.*

2. LINES AND ANGLES

- **PARALLEL LINES AND ANGLE RELATIONSHIPS**
  - **HSG.CO.C.9** *Apply and prove theorems about lines and angles.*
  - **HSG.CO.A.1** *Based on the undefined notions of point, line, plane, distance along a line, and distance around a circular arc, define: angle, line segment, circle, perpendicular lines, parallel lines.*

- **PERPENDICULAR BISECTOR AND ANGLE BISECTOR THEOREMS**
  - **HSG.CO.C.9** *Apply and prove theorems about lines and angles.*
  - **HSG.CO.C.10** *Apply and prove theorems about triangles.*
  - **HSG.CO.A.1** *Based on the undefined notions of point, line, plane, distance along a line, and distance around a circular arc, define: angle, line segment, circle, perpendicular lines, parallel lines.*

- **SLOPE-INTERCEPT FORM OF A LINEAR EQUATION**
  - **HSG.GPE.B.5** *Prove the slope criteria for parallel and perpendicular lines. Use the slope criteria for parallel and perpendicular lines to solve geometric problems.*

3. COORDINATE GEOMETRY

- **LENGTH AND THE DISTANCE FORMULA**
  - **HSG.GPE.B.6** *Find the midpoint between two given points; and find the endpoint of a line segment given the midpoint and one endpoint.*
  - **HSG.GPE.B.7** *Use coordinates to compute perimeters of polygons and areas of triangles and rectangles.*
  - **HSG.MG.A.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).*

- **MIDPOINT FORMULA ON THE COORDINATE PLANE**
  - **HSG.GPE.B.6** *Find the midpoint between two given points; and find the endpoint of a line segment given the midpoint and one endpoint.*
  - **HSG.MG.A.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).*
  - **HSG.GPE.B.7** *Use coordinates to compute perimeters of polygons and areas of triangles and rectangles.*

- **CONJECTURES IN COORDINATE GEOMETRY**
  - **HSG.CO.C.10** *Apply and prove theorems about triangles.*
  - **HSG.GPE.B.4** *Use coordinates to prove simple geometric theorems algebraically.*

4. PERIMETER AND AREA ON THE COORDINATE PLANE

- **PERIMETER ON THE COORDINATE PLANE**
  - **HSG.GPE.B.7** *Use coordinates to compute perimeters of polygons and areas of triangles and rectangles.*
  - **HSG.MG.A.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).*
  - **HSG.GPE.B.4** *Use coordinates to prove simple geometric theorems algebraically.*

- **AREA ON THE COORDINATE PLANE**
  - **HSG.GPE.B.7** *Use coordinates to compute perimeters of polygons and areas of triangles and rectangles.*

5. TRANSFORMATIONS ON THE COORDINATE PLANE

- **TRANSFORMATIONS ON THE COORDINATE PLANE**
  - **HSG.CO.A.3** *Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and/or reflections that carry it onto itself.*
  - **HSG.CO.A.2** *Represent transformations in the plane (e.g. using transparencies, tracing paper, geometry software, etc.). Describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not. (e.g., translation versus dilation).*
  - **HSG.CO.A.5** *Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure, (e.g., using graph paper, tracing paper, miras, geometry software, etc.). Specify a sequence of transformations that will carry a given figure onto another.*
  - **HSG.CO.B.6** *Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure. Given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.*
  - **HSG.CO.A.4** *Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.*
  - **HSG.SRT.A.1** *Verify experimentally the properties of dilations given by a center and a scale factor. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.*
  - **HSG.SRT.A.2** *Given two figures: Use the definition of similarity in terms of similarity transformations to determine if they are similar Explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.*

- **DILATIONS, TRANSLATIONS, ROTATIONS, AND REFLECTIONS**

- **HSG.CO.A.3** *Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and/or reflections that carry it onto itself.*
- **HSG.CO.A.2** *Represent transformations in the plane (e.g. using transparencies, tracing paper, geometry software, etc.). Describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not. (e.g., translation versus dilation).*
- **HSG.CO.A.5** *Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure, (e.g., using graph paper, tracing paper, miras, geometry software, etc.). Specify a sequence of transformations that will carry a given figure onto another.*
- **HSG.CO.B.6** *Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure. Given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.*
- **HSG.CO.A.4** *Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.*
- **HSG.SRT.A.1** *Verify experimentally the properties of dilations given by a center and a scale factor. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.*
- **HSG.SRT.A.2** *Given two figures: Use the definition of similarity in terms of similarity transformations to determine if they are similar Explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.*

6. CONGRUENCE

- **TRIANGLES AND CONGRUENCE TRANSFORMATIONS**
  - **HSG.CO.C.10** *Apply and prove theorems about triangles.*
  - **HSG.CO.B.8** *Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions. Investigate congruence in terms of rigid motion to develop the criteria for triangle congruence (ASA, SAS, AAS, SSS, and HL).*
  - **HSG.CO.B.7** *Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.*
  - **HSG.CO.B.6** *Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure. Given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.*
  - **HSG.SRT.B.5** *Use congruence (SSS, SAS, ASA, AAS, and HL) and similarity (AA, SSS~, SAS~) criteria for triangles to solve problems. Use congruence and similarity criteria to prove relationships in geometric figures.*
  - **HSG.CO.A.2** *Represent transformations in the plane (e.g. using transparencies, tracing paper, geometry software, etc.). Describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not. (e.g., translation versus dilation).*

- **CONGRUENCE OF OTHER POLYGONS**
  - **HSG.MG.A.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).*
  - **HSG.CO.A.5** *Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure, (e.g., using graph paper, tracing paper, miras, geometry software, etc.). Specify a sequence of transformations that will carry a given figure onto another.*
  - **HSG.CO.B.6** *Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure. Given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.*
  - **HSG.CO.A.2** *Represent transformations in the plane (e.g. using transparencies, tracing paper, geometry software, etc.). Describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not. (e.g., translation versus dilation).*
  - **HSG.CO.A.3** *Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and/or reflections that carry it onto itself.*

7. SIMILARITY

- **TRIANGLES AND SIMILARITY TRANSFORMATIONS**
  - **HSG.CO.C.10** *Apply and prove theorems about triangles.*
  - **HSG.SRT.B.4** *Use triangle similarity to apply and prove theorems about triangles.*
  - **HSG.SRT.A.2** *Given two figures: Use the definition of similarity in terms of similarity transformations to determine if they are similar Explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs*

of angles and the proportionality of all corresponding pairs of sides.

- **HSG.SRT.B.5** *Use congruence (SSS, SAS, ASA, AAS, and HL) and similarity (AA, SSS~, SAS~) criteria for triangles to solve problems. Use congruence and similarity criteria to prove relationships in geometric figures.*
- **HSG.SRT.A.3** *Use the properties of similarity transformations to establish the AA, SAS~, SSS~ criteria for two triangles to be similar.*

SIMILARITY OF OTHER POLYGONS

- **HSG.SRT.A.2** *Given two figures: Use the definition of similarity in terms of similarity transformations to determine if they are similar Explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.*

8. TRIANGLES

TRIANGLE ANGLE THEOREMS

- **HSG.CO.C.10** *Apply and prove theorems about triangles.*

TRIANGLE BISECTORS

- **HSG.CO.C.9** *Apply and prove theorems about lines and angles.*
- **HSG.CO.C.10** *Apply and prove theorems about triangles.*
- **HSG.SRT.B.4** *Use triangle similarity to apply and prove theorems about triangles.*
- **HSG.SRT.B.5** *Use congruence (SSS, SAS, ASA, AAS, and HL) and similarity (AA, SSS~, SAS~) criteria for triangles to solve problems. Use congruence and similarity criteria to prove relationships in geometric figures.*
- **HSG.CO.D.12** *Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).*
- **HSG.CO.D.13** *Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.*
- **HSG.C.A.3** *Construct the inscribed and circumscribed circles of a triangle. Prove properties of angles for a quadrilateral inscribed in a circle.*

MEDIANS AND ALTITUDES OF TRIANGLES

- **HSG.CO.C.10** *Apply and prove theorems about triangles.*

9. QUADRILATERALS AND CONSTRUCTIONS

CONSTRUCTIONS

- **HSG.CO.D.12** *Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).*

PARALLELOGRAMS AND RECTANGLES

- **HSG.CO.C.11** *Apply and prove theorems about quadrilaterals.*
- **HSG.MG.A.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).*

SQUARES AND RHOMBI

- **HSG.CO.C.11** *Apply and prove theorems about quadrilaterals.*
- **HSG.MG.A.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).*

10. RIGHT TRIANGLES AND TRIGONOMETRIC RATIOS

PYTHAGOREAN THEOREM

- **HSG.SRT.C.8** *Use trigonometric ratios, special right triangles, and/or the Pythagorean Theorem to find unknown measurements of right triangles in applied problems.*

- **HSG.MG.A.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).*
- **HSG.SRT.B.4** *Use triangle similarity to apply and prove theorems about triangles.*
- **HSG.SRT.B.5** *Use congruence (SSS, SAS, ASA, AAS, and HL) and similarity (AA, SSS~, SAS~) criteria for triangles to solve problems. Use congruence and similarity criteria to prove relationships in geometric figures.*
- **HSG.CO.C.10** *Apply and prove theorems about triangles.*

- **TRIGONOMETRIC RATIOS**
  - **HSG.SRT.C.6** *Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.*
  - **HSG.SRT.C.8** *Use trigonometric ratios, special right triangles, and/or the Pythagorean Theorem to find unknown measurements of right triangles in applied problems.*
  - **HSG.SRT.C.7** *Explain and use the relationship between the sine and cosine of complementary angles.*
  - **HSG.SRT.B.5** *Use congruence (SSS, SAS, ASA, AAS, and HL) and similarity (AA, SSS~, SAS~) criteria for triangles to solve problems. Use congruence and similarity criteria to prove relationships in geometric figures.*
  - **HSG.MG.A.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).*

11. TRIGONOMETRY

- **RADIANS AND THE UNIT CIRCLE**
  - **HSG.SRT.C.8** *Use trigonometric ratios, special right triangles, and/or the Pythagorean Theorem to find unknown measurements of right triangles in applied problems.*
  - **HSG.C.B.5** *Derive using similarity that the length of the arc intercepted by an angle is proportional to the radius. Derive and use the formula for the area of a sector. Understand the radian measure of the angle as a unit of measure.*

- **LAWS OF SINE AND COSINE**
  - **HSG.SRT.C.8** *Use trigonometric ratios, special right triangles, and/or the Pythagorean Theorem to find unknown measurements of right triangles in applied problems.*
  - **HSG.SRT.D.9** *Derive the formula A = 1/2 ab sin(C) for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.*
  - **HSG.SRT.D.10** *Prove the Laws of Sines and Cosines and use them to solve problems.*
  - **HSG.SRT.D.11** *Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles.*

12. CIRCLES 1

- **CIRCLE BASICS**
  - **HSG.C.A.2** *Identify, describe, and use relationships among angles, radii, segments, lines, arcs, and chords as related to circles.*
  - **HSG.CO.A.1** *Based on the undefined notions of point, line, plane, distance along a line, and distance around a circular arc, define: angle, line segment, circle, perpendicular lines, parallel lines.*

- **CIRCLES**
  - **HSG.CO.A.1** *Based on the undefined notions of point, line, plane, distance along a line, and distance around a circular arc, define: angle, line segment, circle, perpendicular lines, parallel lines.*
  - **HSG.GPE.A.1** *Derive the equation of a circle of given center and radius using the Pythagorean Theorem. Complete the square to find the center and radius of a circle given by an equation.*

13. CIRCLES 2

- **CENTRAL ANGLES, INSCRIBED ANGLES, AND CHORDS**
  - **HSG.C.A.2** *Identify, describe, and use relationships among angles, radii, segments, lines, arcs, and chords as related to circles.*

- **HSG.CO.A.1** *Based on the undefined notions of point, line, plane, distance along a line, and distance around a circular arc, define: angle, line segment, circle, perpendicular lines, parallel lines.*
- **HSG.CO.C.9** *Apply and prove theorems about lines and angles.*
- **HSG.C.A.3** *Construct the inscribed and circumscribed circles of a triangle. Prove properties of angles for a quadrilateral inscribed in a circle.*
- **HSG.C.B.5** *Derive using similarity that the length of the arc intercepted by an angle is proportional to the radius. Derive and use the formula for the area of a sector. Understand the radian measure of the angle as a unit of measure.*

- **SECANTS, ANGLES, AND INTERCEPTED ARCS**
  - **HSG.CO.A.1** *Based on the undefined notions of point, line, plane, distance along a line, and distance around a circular arc, define: angle, line segment, circle, perpendicular lines, parallel lines.*
  - **HSG.CO.C.9** *Apply and prove theorems about lines and angles.*
  - **HSG.C.A.2** *Identify, describe, and use relationships among angles, radii, segments, lines, arcs, and chords as related to circles.*

- **TANGENTS, ANGLES, AND INTERCEPTED ARCS**
  - **HSG.CO.A.1** *Based on the undefined notions of point, line, plane, distance along a line, and distance around a circular arc, define: angle, line segment, circle, perpendicular lines, parallel lines.*
  - **HSG.CO.C.9** *Apply and prove theorems about lines and angles.*
  - **HSG.C.A.2** *Identify, describe, and use relationships among angles, radii, segments, lines, arcs, and chords as related to circles.*

14. PROPERTIES OF CIRCLES

- **CONGRUENT AND SIMILAR CIRCLES**
  - **HSG.CO.A.1** *Based on the undefined notions of point, line, plane, distance along a line, and distance around a circular arc, define: angle, line segment, circle, perpendicular lines, parallel lines.*
  - **HSG.C.A.1** *Prove that all circles are similar.*
  - **HSG.CO.A.4** *Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.*
  - **HSG.CO.B.6** *Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure. Given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.*
  - **HSG.SRT.A.2** *Given two figures: Use the definition of similarity in terms of similarity transformations to determine if they are similar Explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.*

- **CIRCUMFERENCE AND ARC LENGTH**
  - **HSG.GMD.A.1** *Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.*
  - **HSG.CO.A.1** *Based on the undefined notions of point, line, plane, distance along a line, and distance around a circular arc, define: angle, line segment, circle, perpendicular lines, parallel lines.*
  - **HSG.MG.A.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).*

- **AREA OF CIRCLES AND SECTORS**
  - **HSG.GMD.A.1** *Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.*
  - **HSG.MG.A.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).*
  - **HSG.CO.A.1** *Based on the undefined notions of point, line, plane, distance along a line, and distance around a circular arc, define: angle, line segment, circle, perpendicular lines, parallel lines.*
  - **HSG.C.B.5** *Derive using similarity that the length of the arc intercepted by an angle is proportional to the radius. Derive and use the formula for the area of a sector. Understand the radian measure of the angle as a unit of measure.*

15. SURFACE AREA

- **SURFACE AREA AND VOLUME OF SPHERES**
  - **HSG.GMD.A.2** *Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.*
  - **HSG.GMD.A.3** *Use volume formulas for cylinders, pyramids, cones, spheres, and to solve problems which may involve composite figures. Compute the effect on volume of changing one or more dimension(s).*
  - **HSG.GMD.B.4** *Identify the shapes of two-dimensional cross-sections of three- dimensional objects. Identify three-dimensional objects generated by rotations of two-dimensional objects.*
  - **HSG.MG.A.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).*

- **SURFACE AREA OF COMPOSITE SOLIDS**
  - **HSG.MG.A.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).*

- **SURFACE AREA OF SIMILAR SOLIDS**
  - **HSG.MG.A.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).*

16. VOLUME 1

- **RELATING TWO-DIMENSIONAL FIGURES TO THREE-DIMENSIONAL SOLIDS**
  - **HSG.GMD.B.4** *Identify the shapes of two-dimensional cross-sections of three- dimensional objects. Identify three-dimensional objects generated by rotations of two-dimensional objects.*

- **VOLUME OF PRISMS AND PYRAMIDS**
  - **HSG.GMD.A.2** *Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.*
  - **HSG.GMD.B.4** *Identify the shapes of two-dimensional cross-sections of three- dimensional objects. Identify three-dimensional objects generated by rotations of two-dimensional objects.*
  - **HSG.GMD.A.1** *Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.*
  - **HSG.GMD.A.3** *Use volume formulas for cylinders, pyramids, cones, spheres, and to solve problems which may involve composite figures. Compute the effect on volume of changing one or more dimension(s).*
  - **HSG.MG.A.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).*

- **VOLUME OF CYLINDERS AND CONES**
  - **HSG.GMD.A.1** *Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.*
  - **HSG.GMD.A.2** *Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.*
  - **HSG.GMD.A.3** *Use volume formulas for cylinders, pyramids, cones, spheres, and to solve problems which may involve composite figures. Compute the effect on volume of changing one or more dimension(s).*
  - **HSG.MG.A.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).*
  - **HSG.GMD.B.4** *Identify the shapes of two-dimensional cross-sections of three- dimensional objects. Identify three-dimensional objects generated by rotations of two-dimensional objects.*

17. VOLUME 2

- **MODELING SITUATIONS WITH GEOMETRY**
  - **HSG.MG.A.2** *Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile,*

BTUs per cubic foot).

- **HSG.MG.A.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).*

- **VOLUME OF COMPOSITE SOLIDS**
  - **HSG.MG.A.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).*
  - **HSG.GMD.A.3** *Use volume formulas for cylinders, pyramids, cones, spheres, and to solve problems which may involve composite figures. Compute the effect on volume of changing one or more dimension(s).*
  - **HSG.GMD.A.2** *Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.*