Arts Impact

ARTS-INFUSED MATH ARTISTIC PATHWAY—Summer Institute Math/Visual Arts Scope and Sequence (YR-2)

Sixth Grade	Seventh Grade	Eighth Grade
6.4.D two- and three-dimensional figures ***Recognizes and draws two-dimensional representations of three-dimensional figures*** **Arts-Infused** 2-D, 3-D, geometric shape, grid, pattern, proportion rectangle, scale, square, triangle **Math** congruent, geometric solid, net, polygon, polyhedron, pyramid, rectangular prism		
6.4.G two- and three-dimensional figures ***Describes and sorts polyhedra by their attributes: parallel faces, types of faces, number of faces, edges, and vertices*** **Math** attributes, faces (parallel/types/number), edges, polyhedron, vertex/vertices		
6.4.B two- and three-dimensional figures ***Determines the perimeter and area of a composite figure that can be divided into triangles, rectangles****, and parts of circles* **Arts-Infused** perimeter **Math** angle, area, geometric solid, net, pyramid, ratio		
6.4.E two- and three-dimensional figures ***Determines the surface area and volume of rectangular prisms using appropriate formulas and explains why the formulas work*** **Math** surface, volume		
6.4.F two- and three-dimensional figures ***Determines the surface area of a pyramid***		
ARTS **AEL 1.1 concepts** form, geometric, point of view, sculpture, soft sculpture, **AEL 1.2 skills and techniques** affixing, craftsmanship, drawing, making a study, measuring **AEL 2.1 uses a creative process** conceptualizes **AEL 4.2 connections** ***Makes connections between the arts and other content areas*** math **AEL 4.5 world of work** ***Identifies math and art in three-dimensional product construction***		

	7.2.B proportionality and similarity ***Solves single- and multi-step problems involving proportional relationships and verifies the solutions.***	
	7.2.C proportionality and similarity ***Describes proportional relationships in similar figures and solves problems involving similar figures.*** **Arts Infused** proportion	
	7.2.D proportionality and similarity ***Makes scale drawings and solves problems related to scale.*** **Arts Infused** enlarge, diagonal, geometric shape, pattern, proportion, horizontal, parallel, scale, side, symmetry, reflection **Math** angle, base, diagonal, isosceles triangle, ratio, reflection, rotation, scale factor. scalene triangle, circle side, similar figures, translation, triangle, vertex/vertices, vertical	
	7.2.H proportionality and similarity ***Determines whether or not a relationship is proportional and explains reasoning.***	
	7.2.I proportionality and similarity ***Solves single- and multi-step problems involving conversions within or between measurement systems and verifies the solutions.***	
	7.3.C surface area and volume ***Describes the effect that a change in scale factor on one attribute of a two- or three dimensional figure has on other attributes of the figure, such as the side or edge length, perimeter, area, surface area, or volume of a geometric figure***	
	ARTS **AEL 1.1 concepts:** abstract, balance, complementary colors, composition contrast, craftsmanship, detail, exaggeration, flush, geometric shapes, palette, point of view, simplified, texture, thin/thick line, value **AEL 1.2 skills and techniques** enlarging, craftsmanship, drawing, measuring, stippling, tacking, transfer, **AEL 2.1 uses a creative process** conceptualizes **AEL 4.2 connections** ***Makes connections between the arts and other content areas*** math **KITE** back, base, bridle, front, keel, kite face, sail, spar, spine, spreader, tie on point, vent, wingspan	

		8.2A properties of geometric figures ***Identifies pairs of angles as complementary, supplementary, adjacent, or vertical and uses these relationships to determine missing angle measures*** **Math** adjacent angles, complementary/supplementary angles, coordinates, grid, origin, translation, quadrants 1, 2, 3, 4, X and Y axis, vector notation **Arts Infused** horizontal, parallel, perpendicular, plotting, symmetry, transformation. vanishing point, vertical
		8.2B properties of geometric figures ***Determines missing angle measures using the relationships among the angles formed by parallel lines and transversals*** transversals
		8.2.D properties of geometric figures ***Demonstrates and explains the effect of one or more translations, rotations, reflections, or dilations (centered at the origin) of a geometric figure on the coordinate plane*** coordinate plane, dilation, reflection, rotation
		ARTS **AEL 1.1 concepts:** animated, atmospheric perspective, background, composition, design charrette, façade, fascia line, foreground, horizon line, hue, light, middle ground, organic, orthogonal, overlapping, rectilinear, picture plane, proportion, shades/tones, shadow, tints, unity, value **AEL 1.2 skills and techniques** craftsmanship, plotting, perspective, **AEL 2.1 uses a creative process** conceptualizes **AEL 4.2 connections** ***Makes connections between the arts and other content areas*** math

MAP ARTISTIC PATHWAYS
6TH GRADE CURRICULUM EXPECTATIONS through TARGETS AND CRITERIA
DECEMBER

LESSON 1—WINTER
TITLE: Hybrid Soft Sculptures: 2-D Designs to 3-D Figures (Anibots/Humachines)

Art and Math

Target: Makes flat pattern nets for three-dimensional polyhedra.
Criteria: Measures and draws faces and vertices of prisms on one-inch grid paper.

Art

Target: Invents and draws hybrid figure.
Criteria: Draws and labels Anibot figure made of polyhedra from two points of view on 1-inch grid paper.

Target: Creates a *specifications sheet* for hybrid form.
Criteria: Fills out a card with information on the Anibot form: Name, Special Design Features, Surface Area, Volume.

LESSON 2—WINTER
TITLE: Hybrid Soft Sculptures: Polyhedron Patterns and Parts (Anibots/Humachines)

Math

Target: Makes list of required pattern pieces.
Criteria: Identifies quantities of singular and repeated faces of the polyhedra in nets to construct geometric solids.

Art and Math

Target: Uses craftsmanship in pattern making.
Criteria: Measures and counts for accuracy, draws lines with straightedge.

Math

Target: Determines surface area of-polyhedra.
Criteria: Uses math operations to calculate sum of all faces.

Math

Target: Calculates volume of polyhedra.
Criteria: Uses height, width, depth measurement and operations to total polyhedra volume.

LESSON 3—WINTER
TITLE: Hybrid Soft Sculptures: Construction and Engineering (Anibots/Humachines)
Target: Transfers and cuts out pieces for constructing two character polyhedra.
Criteria: Aligns vinyl over pattern, traces lines of pattern onto vinyl with a sharpie and ruler, removes the pattern, and makes smooth cuts.

Art
Target: Uses craftsmanship in taping flattened polyhedra.
Criteria: Lays down the shared edge of the adjacent vinyl pieces and applies tape pieces evenly, flat, and lengthwise on the seam and trims.

Art
Target: Uses craftsmanship in folding and taping flattened polyhedra into three-dimensional form.
Criteria: Connects shared edge of the adjacent vinyl pieces, pinches them flat, applies tape pieces lengthwise to one side and to attach the other side; stuffs before taping up final face of the polyhedron.

LESSON 4—WINTER
TITLE: Hybrid Soft Sculptures: Custom Detailing (Anibots/Humachines)
Art
Target: Visually communicates function or personality of Anibot form.
Criteria: Adds details to distinguish character form.

Art
Target: Uses craftsmanship in assembling polyhedra.
Criteria: Cuts and positions materials with smooth lines, then attaches polyhedra and character details securely.

LESSON 5—SPRING
TITLE: Upgrades (Review): Hybrid Soft Sculptures: Upgrades and Review (Anibots/Humachines)
Math
Target: Reviews attributes of polyhedra.
Criteria: Names number of faces, edges and vertices: identifies congruent faces.

Target: Makes net for upgrade polyhedron.
Criteria: Draws 2-D representation of 3-D figure on one-inch grid paper.

Target: Determines vinyl needed for chosen upgrade.
Criteria: Correctly calculates surface area of polyhedron.

Art and Math
Target: Uses craftsmanship in cutting out accurate polyhedron faces.
Criteria: Measures or traces congruent, precise shapes and cuts vinyl smoothly.

Target: Uses craftsmanship in constructing upgrade polyhedron.
Criteria: Lines up shapes, tapes, folds and trims tape smoothly, stuffs and tightly seals form.

Target: Determines amount of stuffing in upgrade.
Criteria: Measures 3-D form/uses formula to correctly determine volume of polyhedron.

MAP ARTISTIC PATHWAYS
7TH GRADE CURRICULUM EXPECTATIONS through TARGETS AND CRITERIA
NOVEMBER

LESSON 1—WINTER
TITLE: Kites: Calculations and Designs: Enlarging Scale Part I
Art
Target: Plans a symmetrical design for surface decoration (of kite sail).
Criteria: Organizes and draws geometric shapes in reflection on a proportional isosceles triangle on one-inch grid paper—formula: b:h=2:1.

Art and Math
Target: Accurately applies calculations to make a larger scale pattern.
Criteria: Measures using grid, ruler and protractor (optional) and draws full-size proportional pattern of isosceles (sail) and scalene (keel) on one-inch grid paper. (Delta-style kite)

LESSON 2—WINTER
TITLE: Kites: Patterns and Surface Decoration: Enlarging Scale Part II
Art and Math
Target: Enlarges design for surface.
Criteria: Multiplies design shapes by scale factor and plots the vertices of proportional similar figures on one-inch grid paper (kite sail and keel pattern).

Art and Math
Target: Uses craftsmanship in drawing pattern and surface design.
Criteria: Draws clean lines with straightedge and/or compass (optional) aligned with grid lines and vertices on one-inch grid paper.

LESSON 3—WINTER
TITLE: Kites: Balance and Contrast: Shapes, Lines and Colors
Art
Target: Uses pattern to make sail and keel.
Criteria: Traces and cuts graphite paper and Tyvek to same size with smooth clean edges leaving lines visible.

Art
Target: Transfers symmetrical geometric design to surface.
Criteria: Aligns, layers, and paper-clips together enlarged pattern on one-inch grid paper, graphite transfer paper (white side up), and Tyvek shapes, then traces lines.

Art
Target: Creates contrast in interior design.
Criteria: Uses a color palette based on one pair of complementary colors (keel and sail surface decoration).

Art
Target: Uses craftsmanship in drawing.
Criteria: Uses straightedge to draw surface design front and back.

LESSON 4—WINTER
TITLE: Kites: Craftsmanship and Construction: Kites
Math
Target: Calculates measurements for structural elements.
Criteria: Measures and labels length of spine and spars on paper.

Art
Target: Attaches scalene triangle to isosceles triangle on line of symmetry and makes attachment point for line.
Criteria: Adheres longest side of keel to sail symmetrically, securely, and flush on both sides; reinforces and punches hole.

Art and Math
Target: Attaches structural elements using craftsmanship
Criteria: Places spine and spar symmetrically and tapes securely.

Art and Math
Target: Attaches the spreader.
Criteria: Uses calculations to mark attachment points; measures and attaches securely.

Art
Target: Attaches tails in balance using craftsmanship.
Criteria: Makes fringes with precise parallel cuts; tapes continuous edge of kite tail flush to base of kite.

LESSON 5—SPRING
TITLE: Miniature Kites: Reducing Scale
Math
Target: Reviews Delta kite parts and proportions.
Criteria: Lists sail, keel, spine, spar, spreader and 2:1 (b:h) ratio.

Target: Accurately scales down original kite dimensions.
Criteria: Draws 2:1 (b:h) isosceles triangle mini sail (8, 6 or 4 inch base) and right scalene triangle (30/60/90 degrees) mini-keel on grid paper.

Art
Target: Creates contrast and balance in design.
Criteria: Uses complementary colors in symmetrical polygon shapes.

Target: Uses craftsmanship in design.
Criteria: Draws with a ruler, cuts out sail and keel smoothly.

Art and Math
Target: Accurately calculates structural elements.
Criteria: Multiplies mini sail height by formula, measures, marks and/or cuts spine/spars/spreader attachment points.

Target: Adds structural elements with craftsmanship.
Criteria: Tapes spine/spars/spreaders/keel smoothly and symmetrically.

Extension:
Target: Scales up one design polygon.
Criteria: Multiplies mini-sail polygon by scale factor and draws similar figure on grid paper.

MAP ARTISTIC PATHWAYS
8TH GRADE CURRICULUM EXPECTATIONS through TARGETS AND CRITERIA
JANUARY

LESSON 1—WINTER
TITLE: Buildings in Cities: One-Point Perspective:
Art
Target: Recognizes a singular receding space as one-point perspective**.**
Criteria: Draws vanishing point on the horizon line.

Art
Target: Creates a building design in one-point perspective.
Criteria: Draws structure(s) with illusion of depth: establishes the vanishing point at the origin of a grid, creates a facade made of vertical and horizontal lines, draws orthogonal lines leading to the vanishing point (the origin).

Art
Target: Adds unity to building designs.
Criteria: Draws one-point perspective building details with repeated shapes, repeated angles, or symmetry.
Math
Target: Uses parallel lines and transversals that occur in one-point perspective.
Criteria: Identifies constant equidistant lines, the origin, vertices, and complimentary/ supplementary angles in an image which contains one-point perspective and determines missing angles.

LESSON 2—WINTER
TITLE: Building Designs: Transformations
Session I:
Art and Math
Target: Records a building's placement on a coordinate plane.
Criteria: Plots pairs of numbers (x value—left or right +/-; and y value—up or down +/-) for points in a plane relative to the origin: vertices of the front face.

Math
Target: Reflects a peer's building design on the y axis.
Criteria: Reverses x coordinates relative to the origin, and graphs the reflected building.

Math
Target: Dilates the coordinates of three peers' building face/facade designs.
Criteria: Multiplies the coordinates by 1.5 and records calculations on the Math and Art Learning notes.

Session II:
Math
Target: Translates three dilated building face/facade designs on the coordinate plane.
Criteria: Graphs and maintains congruence (same side lengths and angle measurements) and orientation.

Art and Math
Target: Adds depth to transformed building faces.
Criteria: Uses orthogonal lines leading to a (0,0) vanishing point from building face/facade vertices on coordinate plane.

Art
Target: Uses craftsmanship and accuracy in design.
Criteria: Measures for accuracy; aligns tools with grid lines: uses straight edges for drawing all shapes/figures.

LESSON 3—WINTER
TITLE: City Planning: Combining Mathematical Figures
Art and Math
Target: Combines building designs into a city design with one-point perspective and other depth techniques.
Criteria: Uses the origin, coordinate plane, orthogonal lines, and overlapping to tape together building designs at the origin/vanishing point.

LESSON 4—WINTER
TITLE: Cities: Depth through Use of Light and Color
Art
Target: Transfers refined city plan to vellum.
Criteria: Uses rulers and pencils pens to replicate/trace the pre-images and images accurate to original design.

Art
Target: Mixes colors for cityscape from primary watercolors.
Criteria: Uses color wheel to mix secondary, tertiary colors, gray and black from primary colors.

Art
Target: Uses craftsmanship in applying color.
Criteria: Paints to a line using watercolor and brush; lightly and evenly adds color to building and detail planes and shapes.

Art
Target: Creates a sense of light using color values.
Criteria: Paints buildings' façade different than the sides.

LESSON 5—SPRING

TITLE: City in Motion: Coordinate Planes, Vertex, and Perspective

Math

Target: Creates a consistent coordinate plane.

Criteria: Plots a point 15 spaces down and 2 across on a vertical 8.5 in. x 11 in. sheet of (4 x 4 in.) graph paper and draws a horizontal and vertical line intersecting at that point.

Math

Target: Creates a vertex for a building.

Criteria: Plots a point at (20, -20).

Art and Math

Target: Creates a simple building design in one-point perspective.

Criteria: Draws face/facade left, bottom vertex at (20, -20) and adds the illusion of depth by using vertical lines and orthogonal lines leading to the origin.

Art

Target: Uses craftsmanship in design.

Criteria: Measures for accuracy; aligns tools with grid lines: uses straight edges for drawing all shapes/figures.

Math

Target: Records the building's vertices' placement on the coordinate plane.

Criteria: Plots pairs of numbers (x value—left or right +/-; and y value—up or down +/-) for points in a plane relative to the origin: vertices of the front face, side face, top face (if applicable), and details of the buildings.

Math

Target: Performs dilations to building's coordinates.

Criteria: Multiplies coordinates by .25 and .5 and records the calculations.

Art

Target: Creates a sense of light using color.

Criteria: Uses color values: tones/shades and tints using colored pencil to consistently illustrate the direction of the light source from the top left corner of the image.

Math

Target: Collaborates with peers to complete the drawing.

Criteria: Hands original building drawing to another classmate, drafts and colors the .5 dilation, continues the sequence with a subsequent hand-off; drafts and colors the .25 dilation.

Art

Target: Creates a sequence of stills using class' drawings.

Criteria: Scans each completed drawing in order and inserts scans sequentially into a looping slide show to give the illusion of viewing buildings while moving through a city street.