

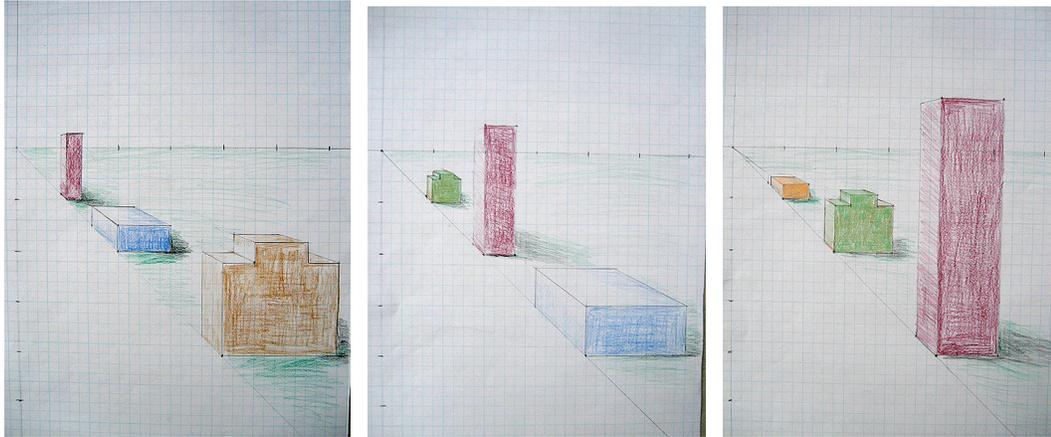
ARTS IMPACT—ARTS-INFUSED INSTITUTE LESSON PLAN (YR2-MAP)

EIGHTH GRADE—LESSON FIVE: Coordinate Planes, Vertex, and Perspective: City in Motion

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Grade Level: 8

Examples:



Enduring Understanding

The illusion of movement through space can be achieved by sequencing and re-sequencing three-dimensional objects using a vanishing point.

Math

Target: Creates a consistent coordinate plane.

Criteria: Plots a point that is 15 spaces down and 2 spaces across on a vertical 8.5 x 11" sheet of 4x4 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); 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.

<p>Materials Mechanical pencils, rulers, 8.5 x 11" 4x4 grid paper, vinyl erasers, colored pencils, Architecture Data Sheet Workbook (ADS)</p>	<p>Learning Targets</p> <ul style="list-style-type: none"> • Creates a consistent coordinate plane. • Creates a vertex for a building. • Creates a simple building design in one-point perspective. • Uses craftsmanship in design. • Records the building's vertices' placement on the coordinate plane. • Performs dilations to building's coordinates. • Creates a sense of light using color. • Collaborates with peers to complete the drawing. • Creates a sequence of stills using class' drawings.
<p>Do Now Simplified buildings (rectangular prisms) are created by groups of three students. After trading coordinates, students dilate the buildings and plot the new facades. By repeating the basic form and color of the original buildings, the illusion of motion is created across the students' three drawings, as their buildings appear to recede into the background. Remember color values may change on each building (compared to the original placement) because all drawings now have a shared light source.</p>	
<p>Activities/Prompts</p> <ul style="list-style-type: none"> • Review trio of images for lesson and ask students what similarities and differences they can identify in comparison/contrast to their cityscapes. • Form architecture firms of three students. • Plot the origin/vanishing point 15 spaces down and 2 across from the top, left corner of a vertical 8.5 x 11" sheet of 4x4 graph paper. • Label the X- and Y-axis. • Plot the lower left corner of the first facade at (20, -20). • Create the facade, using rulers and drawing to the right side of the paper and up—away from (20, -20). The facade can be as big or small as the student desires, but suggest a maximum size of 10 x 10 squares. • Draw orthogonal lines from the facade to the vanishing point/origin. • Complete the rectangular prism by adding the vertical and horizontal lines between the orthogonal lines. • Color the rectangular prism with a single colored pencil: <ul style="list-style-type: none"> ○ Color the facade the darkest value. ○ Color the left side a medium value. ○ Color the top the lightest value. 	<p>Big Art Ideas</p> <p>Color Hue Value Light Shadow Tints Scale</p>

<ul style="list-style-type: none"> • Label the coordinate pairs for the facade and back corners of the rectangular prism. • Record the coordinates and color of each student's buildings on the Architecture Data Sheet. Trade to the right, to avoid having the same student listed twice for the same building coordinates. ADS 11-14 • Dilate the new coordinates by .5 and .25. Remind students that dilation can increase or decrease the size of their shapes. • Plot the dilated coordinate pairs for building two and building three. • Complete the rectangular prism based from the dilated coordinate pairs. • Color the new buildings similarly to how the original student created them. 	
<p>Closure</p> <ul style="list-style-type: none"> • Put all materials and notes/data sheets in a folder. • Return tools as directed. • Self assess using checklist. ADS 11-15 	<p>Assessment Criteria</p> <ul style="list-style-type: none"> <input type="checkbox"/> Plots a point that is 15 spaces down and 2 across on a vertical 8.5 x 11" sheet of 4x4 graph paper and draws a horizontal and vertical line intersecting at that point. <input type="checkbox"/> Plots a point at (20, -20). <input type="checkbox"/> 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. <input type="checkbox"/> Measures for accuracy; aligns tools with grid lines: uses straight edges for drawing all shapes/figures. <input type="checkbox"/> 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. <input type="checkbox"/> Multiplies coordinates by .25 and .5 and records the calculations.

- 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.
- 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.

Next Steps/Follow up Needs

Simple flip books can be created by stacking the students' drawings, and paging through them to add motion. The drawings can also be scanned and placed into a slide show, and electronically paged to create a simple animation.

Teaching and Learning Strategies

1. **Warm-up: discusses the illusion of movement.** *Prompts: We have used math skills to help us create the illusion of depth in our drawings. In this lesson, we are going to use math to assist us in creating the illusion of movement. Let's look at these three examples of one-point perspective, which are similar but not the same as the cityscapes you have already completed. (Example images from page 10-31). Let's talk about how it appears that we are moving through space. What similarities to your cityscapes do you see in these three drawings? What differences? What is happening with these three "buildings?" Where is the vanishing point here? Where are the objects in the background, middle ground, and foreground? In what ways does this still shot have the illusion of depth as an image? Let's see how the objects we are looking at change as we advance the video. (see CD for video/PowerPoint) What happened to the images that used to be in the foreground, middle ground, and background? We are traveling through this space as objects are coming forward from the background. In this lesson, we will be working together to make one moving picture. You will each create a building design in one-point perspective and insert it into three different drawings. Your building will be in the foreground of the first, the middle ground of the second, and the background of the third. When we sequence all of the drawings together it will create the illusion that our viewer is traveling through a city with our buildings (or that the buildings are exchanging positions).*
Student: Discusses the illusion of movement through the projected examples.

2. **Guides students in drawing a building on a plotted point.** *Prompts: Because all of our buildings will be in the same city, the ground that we draw our buildings on needs to be identical as well. Again, we will use math to assist us in this process to ensure that we are consistent. First, we will create a consistent coordinate plane. Plot a point that is 15 spaces down and 2 spaces across from the top, left corner of a vertical 8.5 x 11" sheet of 4x4 graph paper. This spot will serve as our origin. Therefore, you will need to draw your X- and Y-axis coming from that point and make your markers every five spaces for faster counting. As you can see, we will be working in the first and fourth quadrant for this project. Now plot the point (20, -20) and draw a line throughout the paper that connects that point to the origin. This point will also be the bottom left corner of the front face of your building. Draw your simple building face starting with (20, -20) and try to design aligning your vertexes on intersecting lines of the grid paper. Add the necessary side faces, top faces, and simple details using orthogonal lines going towards the vanishing point. You can always use your understanding of complementary, supplementary, and congruent angles to double check your work and make sure your perspective is correct. Remember to always use your ruler to draw lines.*

Student: Creates grid and draws building in one-point perspective; compares drawings and checks for consistency and correct perspective.

Embedded Assessment: Criteria-based teacher checklist; self-assessment

3. Instructs plotting building designs and dilating coordinates. *Prompts: We will be using dilations today to change the sizes of our building designs and create the illusion of moving toward the origin/vanishing point. You will need to record the coordinates of your entire building design in the Architecture Data Sheet (ADS 11-14). Now you will need to calculate the building's coordinates by the scales that we will be using for the dilations. In previous lessons, we used dilations to enlarge a drawing from the origin/vanishing point. This time, we are reducing the size of some of our drawings and bringing them closer to the origin/vanishing point. You will first multiply your building coordinates by .5 and then by .25. As the numbers get smaller, you may need to round to the nearest tenth to make it possible to graph.*

Student: Records building coordinates and calculates the dilated coordinates in the ADS; trades work and double checks for accuracy.

Embedded Assessment: Criteria-based peer assessment

4. Demonstrates adding color to the buildings using consistent light. *Prompts: All of the buildings we have designed are going to end up in the same city so the light will need to be consistent in our collective work. When you add color to your building, plan for the light in the picture to come from the top left corner. As we have talked about in previous lessons, the lighter values of the colors will need to be on the top left side of the building and the darker values/tones on the side opposite the light source. The building's shadows will be on the ground on the right side of the building and the top angle that we will determine the shadow length relative to the side of the building will be 45°. We will be using colored pencils to add color to our buildings. How will we change the values of the hues with colored pencils? (Create denser marks and using more pressure.)*

Student: Adds color to building with imagined light coming from the top left corner of the paper; compares drawings and double checks for the correct illusion of light.

Embedded Assessment: Criteria-based self-assessment

5. Directs plotting buildings in sequence. *Prompts: We have the drawing of our building in the foreground plotted and colored. Now we need to draw the same images in the background and middle ground of two other drawings. We are going to begin trading drawings to do that. Your neighbors in the classroom will be your neighbors in the city that we design. We need to create a loop in the class that we can pass drawings throughout. Most of you will pass to the right, but some of you may have to pass to the next row. Devises plan for passing papers in a loop and assigns each student a sequential number in that loop. Prompts: Write your name and number on the back of your drawing and pass your drawing once to the right. Use the calculations in your Architecture Data Sheet (ADS 11-14) to plot the dilation of your building in the .5 scale on this new drawing. Both buildings should fall on the same orthogonal line. If the building in the foreground overlaps your building, just draw as much as you can of your building without covering the building in the foreground. Color your building using the same colors, values, and shadows as you did in your original drawing in this new drawing. Once you are finished, pass your drawing one more time to the right to plot your building in the third drawing in the .25 scale and color identically.*

Student: Plots dilated building in sequential drawings; compares drawings and double checks for accurate mathematical plotting and coloring.

Embedded Assessment: Criteria-based self-assessment

Vocabulary	Materials and Community Resource	WA Essential Learnings & Frameworks
<p><u>Arts Infused:</u> Sequential Collaborate Plotting</p> <p><u>Math:</u> Dilations(Reverse) Vertex Origin Coordinates</p> <p><u>Arts:</u> Stills Animated</p>	<p>Museum Artworks Lesson 5 video/PowerPoint (see CD)</p> <p>Art Materials: Mechanical pencils Rulers 8.5 x 11" 4x4 grid paper Vinyl erasers Colored pencils</p>	<p>Arts State Grade Level Expectations</p> <p>AEL 1.1 concepts <i>Identifies and demonstrates how line and value define form and space</i></p> <p>AEL 1.1.2 composition <i>Uses proportion to analyze size relationships in an artwork</i></p> <p>AEL 1.2 skills and techniques <i>Uses spatial devices (e.g., one-point perspective)</i></p> <p>AEL 2.3 responding <i>Applies a responding process to an arts presentation with instructor assistance</i></p> <p>Math State Grade Level Expectations</p> <p>8.2.A properties of geometric figures <i>Identifies pairs of angles as complementary, supplementary, adjacent, or vertical and use these relationships to determine missing angle measures</i></p> <p>8.2.D properties of geometric figures <i>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</i></p>

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EIGHTH GRADE—LESSON FIVE: Coordinate Planes, Vertex, and Perspective: City in Motion

Teaching and Learning Strategy 2 and 3

Your Name: _____

Student's Name Building Two: _____

BUILDING TWO	Coordinates	Dilated by .5
Facade Bottom Left	(20, -20)	(10, -10)
Facade Bottom Right		
Facade Top Left		
Facade Top Right		
Back Bottom Left		
<i>Back Bottom Right</i>	NOT VISIBLE	NOT VISIBLE
Back Top Left		
Back Top Right		

Student's Name Building Three: _____

BUILDING THREE	Coordinates	Dilated by .25
Facade Bottom Left	(20, -20)	(5, -5)
Facade Bottom Right		
Facade Top Left		
Facade Top Right		
Back Bottom Left		
<i>Back Bottom Right</i>	NOT VISIBLE	NOT VISIBLE
Back Top Left		
Back Top Right		

ARTS-INFUSED INSTITUTE LESSON PLAN (YR2-MAP)

EIGHTH GRADE—LESSON FIVE: Coordinate Planes, Vertex, and Perspective: City in Motion ASSESSMENT WORKSHEET

Discipline	MATH		ART AND MATH	ART	MATH		ART	MATH	Total 8 Points
Concept	Coordinate Plane	Vertex	One-point Perspective	Craftmanship	Coordinate Plane	Dilations	Light and Color	Collaboration	
Students	Plots a point that is 15 spaces down and 2 spaces across on a vertical 8.5 x 11" sheet of 4x4 graph paper and draws a horizontal and vertical line intersecting at that point	Plots a point at (20, -20)	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	Measures for accuracy; aligns tools with grid lines; uses straight edges for drawing all shapes/figures	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	Multiplies coordinates by .25 and .5 and records the calculations	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	Hands another building drawing to the classmate, drafts and colors the .5 dilation on a classmate's paper, continues the sequence with a subsequent hand-off to the right; drafts and colors the .25 dilation	
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27.									
28.									
Total									
Percentage									

Criteria-based Reflection Questions: (Note examples of student reflections on next page.)

Thoughts about Learning:

Which prompts best communicated concepts? Which lesson dynamics helped or hindered learning?

Lesson Logistics:

Which classroom management techniques supported learning?

Teacher: _____

Date: _____