How Artists Use Elements To Create Space

Companion Guide for *Bullheaded* Chapters 1-13

STEAM Framework:	Primary Discipline: Art Secondary Connections: Weather Science, Math, Literature
Target Grade Level	Grades 4-6
Time Horizon	45-60 minutes
What's included:	1. Quick Links: Curated digital lesson resources 2. Step-by-Step Lesson Plan 3. Hands-On Activities (x2) 4. Read-Aloud Book Connections and Discussion Prompts 5. Vocabulary Definitions, Student Worksheet and Answer Key
Book Connection	Chapters 1-13, *Bullheaded*
Connected Science	Link to Lesson: Extreme Weather & Cloud Physics <insert hyperlink> Link to Math Lesson 1 *(coming soon)*

Quick Links: Curated Digital Resources

Resource	**Link**
Core Lesson Video	**The Virtual Instructor: Elements of Art — Space** (6 min)
Shorter Alternative:	**The Virtual Instructor: Six Ways to Create the Illusion of Space** (4 min)
Museum Art	Georgia O'Keeffe, *Sky above Clouds IV* and Thomas Cole, *Clouds*
Bonus Resource	Art + Science, Educator resource (source: Art Institute of Chicago)

Step-by-Step Lesson Plan

1. **Read for background**: Read *"Bullheaded"* Chapters 1-13 to set the context and map out shifting spatial scales and environments. Notice especially how the story weaves in weather and landscape to create a sense of place and help set mood.
2. **Explore Spatial Principles:** Play the Virtual Instructor – Elements of Art video and explore "How to Create the Illusion of Space in Artworks." Read about four types of art space (Positive, Negative, Deep, Shallow), types of perspective (Linear, Atmospheric), and layout techniques used to show depth (Overlapping, Size, Placement, Detail, Color & Value).
3. **Connect to Hands-On Learning:**
    - **Activity 1:** Coach students to draw a Towering Cumulus Cloud
    - **Activity 2:** Analyze and discuss how Georgia O'Keeffe and Thomas Cole used spatial tools to paint clouds
4. **Discuss the story:** Prompts to check literal and analytical comprehension
5. **Optional:** Teach and test art vocabulary (definitions provided)

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Hands-On Activities

Activity 1: 10 minutes	**Draw a Towering Cumulus Cloud** Student Instructions included Materials: 8”x10” Paper, colored pencils, markers, or watercolors
Activity 2: 5-20 minutes	**Spatial Values Analysis & Class Discussion** Prompts, definitions, teacher reference answer keys included Materials: Ability to project or print images of 2 famous paintings: Georgia O’Keeffe’s *Sky Above Clouds* and Thomas Cole’s *Clouds*.
Book Connection 5 minutes	Read Key Passage & Answer Questions

Activity 1: Draw a Towering Cumulus Cloud

Materials: 8x10” paper, drawing pencil, coloring tools (crayons, colored pencils, markers, or watercolors), NOAA images of Towering Cumulus Clouds (links below).
Time horizon: 10 minutes
Teacher preparation: Download these images of Towering Cumulus Clouds from the NOAA JetStream Thunderstorms lesson to use as your model -

- Example of towering cumulus cloud
- Illustration of towering cumulus cloud

Student instructions:

1. **Prep the Canvas:** Fold an 8"x10" sheet of paper in half horizontally. Leave the top half completely blank to serve as a high-volume negative space area for the upper sky.
2. **Draw the Horizon:** Draw a thin, flat horizon line along the bottom inch (or so) of the page.
3. **Sketch the Cloud:** Sketch a Towering Cumulus Cloud, reaching up to the middle fold.
4. **The "Sun Corner" Shading Challenge:** Place a tiny pencil dot in a top corner to represent the Sun. Color the cloud curves facing away from the dot with dark gradients to create 3D shadows.
5. **Add Color:** Use you preferred medium to color your drawing (crayons, colored pencils or markers, watercolors)

Book Question: *The wide-open empty pastures surrounding her grandparents’ house make Grace feel empty, dull and scattered. How did you use a tiny horizon line and empty sky space to make your drawn cloud feel just as massive and overwhelming as the landscape felt to Grace?"*
Math Connection: Cloud drawing can be used in M1.U1.L4-Math_TBD

Evidence of Learning (What to Check)

- **Horizon Line:** Verify the student's horizon line is drawn thin and low. A low horizon creates a worm's-eye view, making the earth look distant and the cloud monumental.

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- **Value Gradients:** Check that the sky shows atmospheric perspective (dark, rich pressure at the top blending fluidly into a light, faded value at the middle fold). Check that the cloud bumps show 3D roundness using the "Sun Corner" light rules.

Activity 2: Side-by-Side Art Analysis

Compare spatial qualities of two different cloud paintings

Materials: Ability to project side-by-side digital images from website, or to provide print copies of Georgia O'Keeffe's "Sky Above Clouds IV" and Thomas Cole's "Clouds"
Time Horizon: 5-25 minutes
Teacher Directions: Project images of both paintings side-by-side on your classroom board. Lead discussion of how each artist used spatial tools to portray clouds.
Topics are broken into five sections; allow about five minutes to analyze and discuss one section. Choose one or more of these topics:

1. Positive vs. Negative Space
2. Deep vs. Shallow Space
3. Linear vs. Atmospheric Perspective
4. Layout Tools
5. Tone and Shading

Introduction: Both paintings depict clouds – but in vastly different styles. Let's discuss how each artist uses space, types of perspective, layout techniques and tone and shading in their art.

SECTION 1: POSITIVE VS. NEGATIVE SPACE
Definition: Positive space is the area occupied by the main subject; negative space is the empty area around it.
Side-by-Side Prompt:
Look closely at the canvas shapes. In Georgia O'Keeffe's painting, the white clouds are arranged like tightly packed rows, filling up a massive portion of the lower canvas. In Thomas Cole's painting, large, stormy cloud masses swirl dynamically through the center of the frame.
Student Reflection Questions:

1. For each painting, point out what is the positive space and what is the negative space.
2. How does O'Keeffe use the negative space of the upper pale blue sky to make her cloud rows feel endless?
3. How does Cole use dark, shadowy negative space around his gray-and-purple cloud to make the weather look turbulent and shifting?

SECTION 1: TEACHER REFERENCE ANSWER KEY

Space (Positive/Negative): *In O'Keeffe's work, the geometric cloud shapes are the positive space; the blue gaps and upper pink/blue sky form the negative space. In Cole's work, the heavy storm mass is the positive space; the open, windy background sky creates the negative space.*

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SECTION 2: DEEP VS. SHALLOW SPACE

Core Definition: Deep space shows an illusion of vast, miles-away background distance; shallow space looks flat or squished near the front.

Side-by-Side Prompt:

O'Keeffe painted her piece after looking out the window of a commercial airplane, while Cole painted his study rapidly outdoors from the ground after traveling through Europe.

Student Reflection Questions:

1. Do these paintings depict deep space or shallow space? Explain your reasoning using details from the canvas.
2. Even though O'Keeffe's painting style uses very flat, simple shapes, how does she manage to give the viewer a sense of deep, soaring distance looking out toward the horizon line?

SECTION 2: TEACHER REFERENCE ANSWER KEY

Depth (Deep/Shallow): *Both paintings successfully establish deep space. O'Keeffe creates depth through an extensive grid pattern that recedes into the distance. Cole creates depth by contrasting a solid, dark foreground earth strip against a vast, soaring sky.*

SECTION 3: LINEAR VS. ATMOSPHERIC PERSPECTIVE

Core Definition: Linear perspective uses geometric lines converging at a vanishing point; atmospheric perspective uses color values and soft details to show miles of hazy air.

Side-by-Side Prompt:

Compare the horizon lines and the edges of the cloud forms. O'Keeffe uses a straight, geometric pink horizon line where all her cloud shapes systematically march toward the back of the picture plane. Cole uses realistic brushwork to capture thick layers of changing air.

Student Reflection Questions:

1. Which artist relies heavily on linear perspective to organize their composition, and which artist relies strictly on atmospheric perspective to make the air look thick, heavy, and wet?
2. Look at the horizon line in both paintings. How does the choice of a high horizon line (O'Keeffe) vs. a low horizon line (Cole) change where the viewer feels like they are standing?

SECTION 3: TEACHER REFERENCE ANSWER KEY

Perspective: *O'Keeffe uses a stylized variation of linear perspective, using a rigid grid of diminishing cloud shapes that lead straight to a distinct vanishing field at the horizon. Cole uses purely atmospheric perspective, changing color temperatures and softening details to portray towering clouds.*

SECTION 4: LAYOUT TOOLS (OVERLAPPING, SIZE, AND PLACEMENT)

Core Definition: Overlapping shows layers; size changes scale from large to tiny; placement changes distance based on how low or high an object sits on the paper.

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Side-by-Side Prompt:
To create the illusion of three-dimensional depth on a flat surface, artists use specific layout rules. Look closely at how the individual cloud modules are positioned.
Student Reflection Questions:

1. Find an area in either painting where overlapping is used to show that one cloud layer is sitting directly in front of another layer.
2. Trace your eye from the bottom of O'Keeffe's painting to the top. How does her use of size and placement change as the cloud shapes approach the straight pink line?
3. Look at Cole's painting. How does the size and placement of small trees along the bottom ground edge help establish the massive scale of the cloud banking above them?

SECTION 4: TEACHER REFERENCE ANSWER KEY
Layout Techniques: *O'Keeffe relies heavily on size and placement (clouds get dramatically smaller and rise higher on the canvas as they recede). Cole uses overlapping cloud banks and sets them against a tiny line of land at the bottom to exaggerate the vertical scale.*

SECTION 5: TONE AND SHADING (COLOR, VALUE, AND DETAIL)
Core Definition: Color/value turns objects darker/warmer up close and lighter/cooler far away; detail uses sharp textures up close and soft textures in the distance.
Side-by-Side Prompt:
Look at the paint transitions and textures. Cole uses a rapid, dramatic blending of gray, purple, white, and shifting light values influenced by classic European landscape masters. O'Keeffe uses flat, repeating, rhythmic dabs of bright white paint that change values smoothly.
Student Reflection Questions:

1. In Cole's painting, where is the light source? Point out dark values (shadows) and light values (highlights) that create a 3D pillowy roundness in his cloud.
2. Look at the colors near the bottom edge of O'Keeffe's canvas compared to the colors near her distant horizon. How does her use of color and value create a sense of fading atmospheric haze?
3. Which painting uses sharp, realistic textures and detail to suggest a real weather event, and which one feels more abstract, peaceful, and patterns-focused?

TEACHER REFERENCE ANSWER KEY – SECTION 5
Color, Value, & Detail: *Cole uses a chiaroscuro effect with gray and purple undertones to sculpt 3D volume and shadow. O'Keeffe uses a steady, repeating value gradient where the blue intervals deepen in the foreground and the upper sky smoothly fades from soft rose to light blue at the horizon.*

Read-Aloud Book Connections and Discussion Prompts

Directions to students: Review the passage below. Use evidence from the text to answer the questions that follow.

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Key Book Passage: Chapter 13, Page 67

> *"I wandered back to the porch and sat on the steps again. Overhead, puffy white clouds cast moving islands of shade, making it feel cooler than the day before. Yesterday's high temperature topped ninety-nine degrees. I hoped the clouds would stick around through Tuesday to make my first day working for Mr. P. a little easier."*

Prompt 1 (Literal Comprehension): What made the day seem cooler to Grace?

Prompt 2 (Analytical): In Chapter 13, Grace prepares for her first day of work, hoeing weeds in Mr. Plumlee's watermelon field. Do you think she is mentally ready for the task? Physically ready for the environment? Cite evidence from the book to support your answer.

TEACHER REFERENCE ANSWER GUIDE

Prompt 1 (Literal): The clouds overhead cast "moving islands of shade" that make the day feel cooler.

Prompt 2 (Analytical): Any answer is acceptable as long as student can support it with evidence

Science connection: The ambient air temperature is the same in shade or sun. Solar radiation makes you feel hotter in the sun. When you step into the shade of a cloud, the incoming solar radiation drops because the puffy white cloud reflects most of it back into space. The Stefan-Boltzmann Law governs the relationship between temperature and radiation.

Meteorologists and military agencies use the Wet Bulb Globe Temperature (WBGT) to measure how much cooler or safer it is in the shade. The WBGT calculates environmental heat stress on the human body based on air temperature, humidity, wind speed, sun angle, and cloud cover.

Vocabulary List: Art Terms (Grades 4-6)

Printable Student Worksheet, Page 7; Teacher Answer Key, Page 8

atmospheric perspective (noun): A technique where objects in the background are drawn lighter, less detailed, and cooler in color value to simulate the effect of looking through miles of hazy air.

color and value (noun): The use of color properties to show depth, where closer objects are darker or warmer, and distant objects are lighter, softer, or cooler.

deep space (noun): The illusion of massive, sweeping distance that makes elements in an artwork look like they are miles away from the viewer.

detail (noun): The clarity of textures and lines in an artwork, where closer subjects are painted with sharp edges and fine textures, while distant objects look blurry, faint, or soft.

linear perspective (noun): A mathematical drawing method that uses lines and specific vanishing points to make objects on a flat surface look three-dimensional.

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negative space (noun): The empty or unoccupied area surrounding the primary objects, such as the open sky surrounding a cloud formation.

overlapping (noun): A structural layer technique where one object is painted directly in front of another, partially blocking the rear object to show that it is further away.

placement (noun): A composition rule where objects placed lower on the canvas look closer to the ground or the viewer, while objects placed higher up look more distant.

positive space (noun): The active areas of a canvas that are completely occupied by the primary subject matter, such as the main body of a large cloud form.

shallow space (noun): A style of composition where objects look flat or pressed close to the front of the picture plane, lacking a deep background or a sense of distant horizon.

size (noun): The scale relationship where objects intended to feel close are painted large, and objects intended to feel far away are painted tiny.

TEACHER ANSWER KEY TO PRINTABLE STUDENT WORKSHEET

1. J (atmospheric perspective)
2. G (color and value)
3. I (deep space)
4. F (detail)
5. B (linear perspective)
6. E (negative space)
7. D (overlapping)
8. C (placement)
9. K (positive space)
10. H (shallow space)
11. A (size)

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STUDENT WORKSHEET: THE ELEMENT OF SPACE IN ART (Grades 4-6)

Student Name: _____ **Date**: _____

Instructions: Match the art terms on the far left with the correct definition in the column on the far right. Write the letter of that definition in the blank space provided in the left column.

Word / Phrase
1. atmospheric perspective _____
2. color and value _____
3. deep space _____
4. detail_____
5. linear perspective _____
6. negative space_____
7. overlapping_____
8. placement_____
9. positive space_____
10. shallow space_____
11. size _____

Definitions	
A	The scale relationship where objects intended to feel close are painted large, and objects intended to feel far away are painted tiny.
B	A mathematical drawing method that uses lines and specific vanishing points to make objects on a flat surface look three-dimensional.
C	A composition rule where objects placed lower on the canvas look closer to the ground or the viewer, while objects placed higher up look more distant.
D	A structural layer technique where one object is painted directly in front of another, partially blocking the rear object to show that it is further away.
E	The empty or unoccupied area surrounding the primary objects, such as the open sky surrounding a cloud formation.
F	The clarity of textures and lines in an artwork, where closer subjects are painted with sharp edges and fine textures, while distant objects look blurry, faint, or soft.
G	The use of color properties to show depth, where closer objects are darker or warmer, and distant objects are lighter, softer, or cooler.
H	A style of composition where objects look flat or pressed close to the front of the picture plane, lacking a deep background or a sense of distant horizon.
I	The illusion of massive, sweeping distance that makes elements in an artwork look like they are miles away from the viewer.
J	A technique where objects in the background are drawn lighter, less detailed, and cooler in color value to simulate the effect of looking through miles of hazy air.
K	The active areas of a canvas that are completely occupied by the primary subject matter, such as the main body of a large cloud form.

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