

Light, Perception, and Photography

EDUCATORS DO NOT NEED TO BE REMINDED THAT with individual cell phones and relatively affordable video cameras, an unprecedented number of lens-based images are being created and shared throughout the world on a daily basis. Students especially seem to love capturing and sharing images. Studying photographs enables them to learn about the cultural and historical context in which the images were created, develop their visual literacy skills, and explore multi- and interdisciplinary connections.

The exhibition featured in these materials, *See the Light—Photography, Perception, Cognition: The Marjorie and Leonard Vernon Collection*, is composed of photographs that serve as representative examples of the entire history of the medium. While photography as we know it today started in the early nineteenth century, the quest to record the natural world as it appears to the human eye actually dates back much further. Included here is an overview of photography as well as some of its underlying principles and manifestations, ranging from issues of human perception to its application to science and even to the way photography helps us formulate how we think about the world. Images selected from the exhibition are now part of the museum's permanent collection.

Since ancient times, humans have noticed—and described—the optical phenomenon that light coming through a pinhole will cast an inverted image on the wall of a dark room (see accompanying timeline). The ways in which humans visually perceive the world — organizing, identifying, and processing visual information— has also been studied for centuries.

Building upon this knowledge, Renaissance artists used the camera obscura (Latin for "darkened room") to capture detailed representations of the physical world. Utilizing light-sensitive chemicals, the invention of photography in the 19th century led to the ability to capture those images and brought science and art together in unique ways. As an instrument of science, the camera can support human vision with a seemingly factual record of what is seen. Yet as an artistic tool, it also has the ability to enhance and record creative vision and ideas and frame "reality" in a way that can sometimes be more akin to fiction.

In addition to the scientific and creative foundations of photography, many uses for photography have flourished over the course of its history, including documentation, scientific study, space exploration, cinema, advertising, and fine art. From its founding during the Industrial Revolution to the unprecedented numbers of photographs circulating around the world in contemporary times, the ways in which photography has been studied and used has been entwined with cultural, economic, political, and scientific changes in society.

The four images highlighted here are included in the exhibition and represent important trends in the history of photography and various scientific disciplines. Some of these themes are analyzed in greater detail in the text accompanying each reproduction. They include the desire to preserve and record the world; the artistic potential of the photographic medium; how photography came to experiment with subjects generated by the modern world and modern art in general, such as abstraction, fragmentation and ambiguity; and individualistic and romantic views of the world, with a special reverence for nature.

Articles of Porcelain

William Henry Fox Talbot (England, 1800–1877)
England, circa 1844

WILLIAM HENRY FOX TALBOT, AN ENGLISH botanist and mathematician, is credited with the invention of the negative-positive print process fundamental to the invention and growth of photography. Talbot was an intellectual who had interests spanning the fields of mathematics, botany, chemistry, astronomy, philosophy, Egyptology, the classics, and art history.

Although he was surrounded by artistic influences his entire life, Talbot could not draw well. While on his honeymoon in Italy in 1833, Talbot became increasingly frustrated with his inability to sketch from nature using the tools many artists employed to draw detailed and highly realistic images. Since he couldn't draw, he began to think about ways that it might be possible to capture images of the world around him, and upon returning to his home in England he began a series of experiments. These led to important inventions in the development of photography.

The image *Articles of Porcelain*, made in 1844, was later included in Talbot's book, *The Pencil of Nature*. This image as well as the book demonstrated the multiple uses for photography that Talbot envisioned. Photographing porcelain (along with a companion image of glassware) allowed Talbot to showcase the medium's ability to easily capture details and reflections that would require much time to render through drawing or painting.

Talbot continued to experiment after his initial inventions in the 1830s and 1840s. While he conceived and brought about a wholly new way of making pictures, he also perfected the optical and chemical aspects of photography and learned to use the medium to make complex images of architecture, still lifes, portraits and genre scenes; in so doing, he developed techniques used later by botanists, historians, travelers, and artists.



Articles of Porcelain

William Henry Fox Talbot (England, 1800–1877)

England, circa 1844

Photograph, Calotype, Image: $5\frac{3}{8}$ x $7\frac{1}{8}$ in.

The Marjorie and Leonard Vernon Collection, gift of The Annenberg Foundation,
acquired from Carol Vernon and Robert Turbin (M.2008.40.909)

The Little Novice & Queen Guinevere In The Holy House Of Almsbury

Julia Margaret Cameron (England, 1815–1879)
England, 1874

IN 1874, ALFRED LORD TENNYSON SUGGESTED TO HIS friend and neighbor, photographer Julia Margaret Cameron, that she attempt a photographic illustration of his *Idylls of the King*, a collection of poetry retelling the legend of King Arthur. Tennyson was Britain's most popular and widely read poet at the time, and Cameron, a strong photography advocate, was determined to demonstrate that photography was the equal of any form of book illustration. She worked diligently to get the models, settings, costumes, and accessories exactly right for this project; she reported to a friend that it took 245 attempts before she got 12 usable pictures.

The photograph *The Little Novice & Queen Guinevere In The Holy House of Almsbury* illustrates the section of Tennyson's poem where Guinevere, who is married to King Arthur but has fallen in love with Sir Lancelot, flees to take anonymous shelter at the convent at Almsbury.

It is there that she is befriended by a young novice (a young girl training to be part of the religious community). Cameron's photograph captures an intimate and quiet moment between a sleeping or resting Guinevere and the little novice at her side. Literary and biblical figures and stories were the subject of many of Cameron's photographs, and emotional and physical bonds between women form the basis of many of Cameron's strongest images.

Wanting to challenge the mechanical, technical, and descriptive photographs pervasive at the time, Cameron strove to create photographs that would tell stories and express feelings. Elevating photography beyond description, she often used atmospheric lighting, a soft focus, and imprecise printing methods to create expressive images.



***The Little Novice & Queen Guinevere
In The Holy House Of Almsbury***

Julia Margaret Cameron (England, 1815–1879)
England, 1874

Photograph, Albumen print, Image: 13½ x 10½ in.

The Marjorie and Leonard Vernon Collection, gift of The Annenberg Foundation
acquired from Carol Vernon and Robert Turbin (M.2008.40.378)

Paris, 1929

André Kertész (Hungary, active United States, 1894–1985)
France, 1929, printed circa 1970

IN THE EARLY TWENTIETH CENTURY, THE EIFFEL TOWER became a primary object of inspiration for a generation of avant-garde painters, poets, architects, filmmakers, and historians seeking symbols of the new spirit of their age. André Kertész, a photographer living in Paris, made several studies of the Eiffel Tower after moving to Paris from Budapest in 1925. This photograph by Kertész, *Paris, 1929*, stands as a unique vision for this time. Whereas some photographers pictured the tower as a part of Paris, others organized their images into dislocating patterns of abstract details and shapes. Here, Kertész incorporated shadows of the ironwork with the pedestrians and tourists at the base of the tower, combining his sophisticated understanding of composition with an intriguing and poetic image.

Kertész, like many photographers working between the world wars, sought to create images that reflected their increasingly modern, fast-paced, and somewhat fragmented society. Through abstract compositions made of non-traditional viewpoints, flat planes, geometric shapes, and radical cropping, these photographers created distinct images. Kertész had a sophisticated understanding of composition, yet often created images infused with personal meaning by capturing lyrical moments in the ordinariness of daily existence.

Born in Budapest, Hungary in 1894, Andor (later André) Kertész served in the Austro-Hungarian army during World War I. The photographs he took of the everyday lives of his fellow soldiers started his journey towards a career in photography, which lasted over seventy years. Eventually, Kertész moved to the United States and worked for several prominent magazines, including *Harper's Bazaar*, *Vogue*, *Liŕe*, and *House and Garden*.



Paris, 1929

André Kertész, (Hungary, active United States, 1894–1985)

France, 1929, printed circa 1970

Photograph, Gelatin-silver print, Image: 7¼ x 9¼ in.

The Marjorie and Leonard Vernon Collection, gift of The Annenberg Foundation
acquired from Carol Vernon and Robert Turbin (M.2008.40.1160)

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Surf Sequence

Ansel Adams (United States, 1902–1984)
United States, 1940, printed after 1972

ANSEL ADAMS, BEST KNOWN FOR HIS SPECTACULAR photographs of natural scenes, was also a respected leader and spokesman both for photography as a fine art and for environmental preservation. Born in San Francisco in 1902, at the age of 14 he visited Yosemite with his family for the first time. He instantly fell in love with the majesty and beauty of the Sierra Nevada Mountains, and returned there at least once every year of his life. Although Adams had trained as a concert pianist as a boy and young adult, his love of photography, especially photographing expansive and beautiful wonders of nature, became his lifelong passion and career.

Although he is best known for his images of mountains, it was during a trip along the Northern California coast in 1940 that Adams made this innovative series of five

photographs. *Surf Sequence* was made when Adams turned his camera down at the surf line. Capturing the quiet and poetic movements of the water along the sand, they were expressly made to be seen together as a series.

Adams was a master of the technical aspects of photography, yet he insisted on the medium's unique combination of mechanical execution and creative activity. By age 18 he was already experimenting with composition, texture, and light in his photographs, and refined his method on long expeditions along and with the Sierra Club. Uninterested in emulating painting or other traditional media in his photography, he instead looked back to photography's early practitioners, especially those who had surveyed the American West. An influential teacher and author, Adams approached photography as an interpretive activity.



Surf Sequence

Ansel Adams (United States, 1902–1984)

United States, 1940, printed after 1972

Photograph, Gelatin-silver print, Image: 11 x 14 in.

The Marjorie and Leonard Vernon Collection, gift of The Annenberg Foundation
and promised gift of Carol Vernon and Robert Turbin (M.2008.40.49.1-5)

Photograph by Ansel Adams © 2013 The Ansel Adams Publishing Rights Trust

Light, Perception, and Photography

Timeline

5 th Century BCE	Chinese philosopher Mo Ti recorded the creation of a device in which the light rays of an illuminated object pass through a pinhole into a darkened room and result in an inverted but otherwise exact image of the object. He referred to this device as a "locked treasure room."	1849	David Brewster invented the lenticular stereoscope (device for viewing a pair of separate images, one for each eye), and a binocular camera, leading to a craze for stereoscopic photography.
4 th Century BCE	In Greece, Aristotle described viewing the crescent shape of a partially eclipsed sun projected on the ground through the leaves of a tree, thereby describing the optical principle of a pinhole camera.	1861–65	The American Civil War was the first conflict to be thoroughly photographed. The thousands of photographs made of the Civil War brought images of the realities of modern warfare to the general public.
10 th Century CE	Arabian scholar Ibn al-Haytham Alhazen provided early analysis of various optical phenomena through his observations that an image was sharply defined when the aperture through which it was projected was small, and that the image became diffused as the hole was enlarged to admit more light.	1860s	Photography became a significant tool for the United States government and railroad companies in the efforts of survey teams to document relatively unknown parts of the continent. For the first time, landscape documentation emerged as a viable livelihood for a small group of American photographers.
1490	Leonardo da Vinci provided clear descriptions of the camera obscura (Latin for "darkened room") in his notebooks. Camera obscuras had become familiar to scientists, magicians, and artists during the Renaissance as many descriptions of the device are found from this period.	1872	Eadweard Muybridge was commissioned by former California Governor Leland Stanford to photograph his horse trotting. Refining the use of shutters to record actions during the split-second when the shutters were open, Muybridge's studies in motion throughout the 1870s—of horses galloping on a track and of men vaulting over poles—are considered the precursor to the invention of motion pictures.
1839	Multiple inventions were made public that laid the groundwork for photography. In France, Louis Jacques Mandé Daguerre unveiled detailed, unique, and lasting images on sheets of silver-plated copper; these images contained such accuracy that they were called "a mirror with a memory." The process came to be called "daguerreotype." In England, William Henry Fox Talbot presented calotypes. These were images on paper created from a negative made by covering paper with a silver salt solution and exposing it to sunlight. (The term "calotype" is from the Latin phrase that means "beautiful impression.")	1880s	In Europe and the United States, groups of photographers established societies that were devoted to promoting photography as fine art. Known as Pictorialists, they created highly expressive images. The subject matter of their photographs often drew from mythology and literature and their photographic techniques included soft focus imagery, atmospheric lighting, and printing on textured paper. In addition to creating groups, these photographers utilized exhibition spaces and published magazines to increase the awareness of photography's artistic potential.
1844	Talbot published the first of six installments of his book <i>The Pencil of Nature</i> .		

- 1888 George Eastman Kodak introduced the hand-held Kodak camera and marketed it in the United States. The first camera designed for recreational purposes, it provided a relatively inexpensive way to take pictures. Amateur photography flourished in the following decades as thousands of people began taking snapshots of the world around them.
- 1925 A small, light, and fast camera called the Leica allowed photographers to capture the activity of street life with greater accuracy and imagination.
- 1925 László Moholy-Nagy published *Painting Photography Film*, which advocated for the camera as a modern graphic tool and the creative use of new visual media—such as photography and film—within the global and mechanical modern world.
- 1932 In California, a group of photographers who shared a common photographic style based on precise images of natural forms and found objects created a group called f/64. The name referred to the smallest aperture (“f-stop”) setting on a large format camera and the one which allows a great depth of field. These photographers advocated for a realist aesthetic with sharp focus images and utilized contact printing on glossy paper.
- 1935 During the Great Depression, the Farm Security Administration of the U.S. government commissioned eleven photographers to travel throughout the country and document the conditions faced by farmers who suffered through drought and economic depression. Pictures by photographers such as Dorothea Lange, Arthur Rothstein, and Walker Evans have become enduring images of this period.
- 1936 The cover of the first issue of *Life* magazine features a photograph of Fort Peck Dam by Margaret Bourke-White, whose career included images ranging from industrial photography to portraits of world leaders.
- 1955 Edward Steichen’s landmark exhibition *The Family of Man*, highlighting the universality of human experience through over 500 photographs, opened at MoMA and subsequently toured the world for eight years.
- 1962 John Szarkowski succeeded Edward Steichen as curator of photography at MoMA. His 1966 exhibition *The Photographer’s Eye* (and publication by the same name) showcased the range of photography through its history.
- 1976 Los Angeles residents Marjorie and Leonard Vernon began to collect photography.
- 2008 LACMA acquired the Marjorie and Leonard Vernon Collection of photography.

About the Vernon Collection

In 1976, when Los Angeles residents Marjorie and Leonard Vernon began to collect photography, it was not widely collected by major museums or fine art collectors. The Vernons built a collection of some 3,600 photographs spanning the entire history of photography through careful research of photographers and of the medium and through their understanding of the centrality of photography in modern visual culture. Championing photography as a significant part of human expression, the Vernons fostered a community of photography enthusiasts and generously shared their home and their knowledge of photography with this expanding circle. In 2008 the Vernon collection of photography became part of the permanent collection of the Los Angeles County Museum of Art, thereby allowing the museum to present the history of photography alongside the museum’s larger encyclopedic collection of art from many cultures and time periods.

Sources

Britt Salvesen, *See The Light—Photography, Perception, Cognition: The Marjorie and Leonard Vernon Collection* and Naomi Rosenblum, *World History of Photography*. Third Edition.

Credits

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Classroom Activity

Drawing for Observation & Description

Enduring Understanding	Artists often create photographs to describe the properties of objects.
Grades	K–12
Time	One to three class periods
Art Concepts	Line, 2D shape, 3D form, composition, symmetry, light, value
Materials	Assorted found objects, cardboard, pencils, and paper. Optional: miniature flashlight.
Talking about Art	View and discuss the printed image of <i>Articles of Porcelain</i> (circa 1844) by William Henry Fox Talbot.

What do you see? Use the language of the visual arts to describe your observations. Identify organic (curvy) lines and geometric (straight, angular) lines. What shapes do these lines create? Identify 2D shapes, such as rectangles, circles, and triangles.

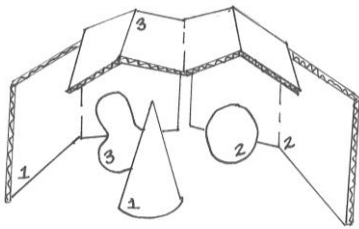
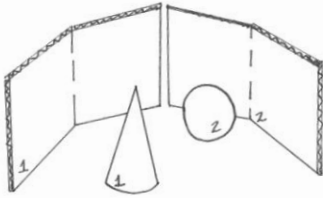
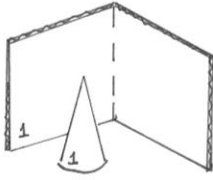
What familiar objects do you notice? Use the language of mathematics to describe your observations. Identify 3D forms such as rectangular prisms, cylinders, and pyramids.

How are the objects arranged? In art, the arrangement of objects (or visual elements) is called composition. Use your finger to divide the composition in half. What do you notice about either side? In math, this composition can be described as symmetrical and the dividing line as the line of symmetry.

If you were to rearrange these objects to create a different composition, what changes would you make? How would you keep the arrangement symmetrical? How might you create asymmetry?

This symmetrical composition was created by a mathematician-turned-photographer named William Henry Fox Talbot. Talbot became increasingly frustrated with his inability to draw realistically so he thought about other ways to capture images of the world around him. He began a series of experiments with light, which led to the important invention of the negative-positive print process, a process that proved fundamental to the growth of photography. *Articles of Porcelain* (along with a companion image of glassware) showcased photography's ability to easily capture details and reflections that would require much time to render through traditional methods such as drawing and painting.

Making Art



Bring a miniature object from home to the classroom. Create a simple still life with your miniature object by placing it in front of a standing piece of cardboard, folded in half to create a corner. Place the still life in the direction of the sun and watch as the light source creates spatial and shadow effects. Record your observations by sketching the object, taking careful note of the lines and shapes that you see. Add values of light and dark to the 2D shapes that you drew, in order to describe the object's 3D form. The spot where direct light hits the object should be the lightest value. The bottom of the object and the shadow that it creates should be the darkest value.

Next, pair up with a partner and combine your objects and cardboard pieces to create a new still life. Place the still life in a different part of the room, under a different light condition. Study the properties of the objects and note differences, such as the changing light source, shadows, and reflections. Record your new observations in drawing.

Then, ask another student to join your pair to create a group of three. Combine all three objects and cardboard pieces. Try enclosing the objects, using the cardboard pieces to form walls and a roof, and experiment with different ways to control the light source. Study the changing lines, shapes, shadows, and reflections that you see and record your final observations in drawing.

Along the way, you may consider comparing and contrasting natural versus artificial light sources, using sunlight and a miniature flashlight.

Reflection

Combine your drawings to create a portfolio that documents the observations of the group. Share your group's portfolio with another group and talk to each other about your individual and group investigations. Reflect by responding to the following questions:

What lines and shapes did you find in your object(s)? How did these lines and shapes create shadows and reflections under light? How did the shadows and reflections change when you changed the light source?

Curriculum Connection

Layer in the language of mathematics as you analyze the composition of *Articles of Porcelain* and as you discuss the forms that simple objects can take. For the upper grades, select one object from the artwork and assign dimensions to the object. Ask students to calculate the area of the 2D shape created by the object as well as the volume of the 3D form. Start with simple cubes and rectangular prisms then move on to more complex forms such as cylinders and pyramids.

Classroom Activity

Literature, Illustration, and Photography

Enduring Understanding	Artists often create photographs to add sensory dimension to the written narrative.
Grades	3–12
Time	One to three class periods
Art Concepts	Composition, mood, collage, texture
Materials	Source imagery (such as magazine cut-outs or pre-printed images on vellum paper), sturdy paper (such as cardboard or cardstock), glue (glue sticks or decoupage glue and foam brushes), scissors, pencils
Talking about Art	View and discuss the printed image of <i>The Little Novice & Queen Guinevere in the Holy House of Almsbury</i> (1874) by Julia Margaret Cameron.

What do you see? Discuss the interaction unfolding between these two figures. What is their relationship? What has brought them together? Are they sharing the same physical space? If you joined them in this space, what might you see, hear, smell, and feel? What do you see in the image that makes you say that?

This 1874 photograph by renowned female photographer Julia Margaret Cameron illustrates a scene from a collection of poetry entitled *Idylls of the King*. The popular British poet Alfred Lord Tennyson spent nearly 40 years writing the collection of poetry, drawing inspiration from the literary epic of King Arthur. Tennyson asked Cameron, his friend and neighbor, to provide photographic illustrations for the poems. She worked hard to arrange models, settings, costumes, and accessories to create photographs that evoked the narrative and environment created by Tennyson. This particular photograph illustrates the section of Tennyson's poem where Guinevere, who is married to King Arthur but has fallen in love with Sir Lancelot, flees to take anonymous shelter at the convent at Almsbury. It is there that she is befriended by a young novice (an inductee into the religious order).

What mood is evoked by this photograph? What choices did the photographer make to evoke this mood? Wanting to challenge the mechanical, technical, and descriptive photographs pervasive at the time, Cameron strove to create photographs that would tell stories and express feelings. Elevating photography beyond description, she often used atmospheric lighting, a soft focus, and imprecise printing methods to create expressive images.

Making Art

Choose a classroom text to illustrate through photographic collage. Analyze the structure of the text, using the following vocabulary: exposition, inciting incident, rising action, climax, falling action, denouncement, and resolution. Choose one scene from the text to translate into a collage.

What mood does your scene evoke? Is it characterized by a dramatic rising action, a chaotic climax, or a serene and peaceful resolution? Choose three found images that best illustrate the scene's mood. Think about how you will combine the images to create one composition. Where will you place the first image and why? The second? The third? On your sheet of cardboard or cardstock, lightly sketch the arrangement of visual elements within the frame.

Next, use scissors to cut out each image, or try a variety of paper cutting techniques (such as scoring or tearing) to add texture. Then, use glue sticks or decoupage glue and a foam brush to lightly coat the back of each image. Place the images on the cardboard as illustrated in your sketch. Lastly, place a light coat of decoupage glue over the finished product to secure the edges of the cut imagery.

Reflection

Pair up with a fellow student who chose the same scene as you did. Compare and contrast your illustrations. What similarities and differences do you notice? What moods do your artworks evoke? What kinds of artistic choices did you make to capture this mood?

Curriculum Connection

Combine students' collages to create a final storyboard that illustrates the structure of the classroom text. Have students write captions that summarize each scene. Then, they can choose one student work as inspiration for an alternate ending to the story.

How does the outcome of the story change?
Does the new story flow follow a traditional narrative structure?
How might you change the story structure to manipulate the story's mood?

Classroom Activity

The Photographer's Eye: Art, History, and Science

Enduring Understanding	Photography is a unique medium that combines concepts from art, history, and science.
Grades	6–12
Time	One to three class periods
Art Concepts	Shape, form, composition, perspective, expression, experimentation
Materials	Paper and pencil
Talking about Art	View and discuss the printed image of <i>Paris, 1929</i> (1929, printed circa 1970) by André Kertész.

What do you see? Describe the artwork's composition, or the arrangement of visual elements. What choices did the artist have to make in order to capture this skewed sense of perspective? Where might he have been standing in relationship to the street, the meandering people, and the looming architecture? What do you think the artist was thinking about when he created this image?

This photograph, created by André Kertész, documents a typical Parisian day at the landmark Eiffel Tower. The Tower became a primary object of inspiration for a generation of avant-garde painters, poets, architects, filmmakers, and historians seeking new ways to represent the world around them. Kertész, a Hungarian born photographer living in Paris, made several studies of the Eiffel Tower. Taken from an aerial perspective, this particular photograph juxtaposes shadows from the Tower's ironwork with the pedestrians below, creating an intriguing and curious composition.

How does this image compare to other images that you have seen of the Eiffel Tower? How is it similar? How is different? While some photographers of the time included the Tower as part of the Parisian landscape, Kertész chose a unique vantage point, resulting in abstraction of shapes, shadows, and form.

Compare Kertész's photograph with later photographs by György Kepes and Jo Ann Callis. György Kepes, an inspiration to artists and scientists alike, was known for experimenting with the nature of light and vision. His book, *The Language of Vision*, explored the nexus of perception science and visual imagery as well as the use of new technologies that impacted the growing medium of photography. A former professor at the Massachusetts of Technology, his approach to photographic practice was truly interdisciplinary. How is this experimental approach reflected in his 1942 photograph *Balance*.



György Kepes, *Balance*, 1942
Gelatin Silver Print
The Marjorie and Leonard Vernon Collection, gift of
The Annenberg Foundation, acquired from Carol
Vernon and Robert Turbin. © The Gvörey Kepes Estate.



Jo Ann Callis, *Black Tablecloth*, 1979
Printed 1984, Dye-imbibition Print, The Marjorie and Leonard Vernon Collection
Gift of The Annenberg Foundation, acquired from Carol Vernon and Robert Turbin,
© Jo Ann Callis.

By the time Jo Ann Callis began creating her "fabricated photographs" in the 1970s, color photography had become a cultural norm, easily accessible to the everyday photographer. However, working in color photography was looked down upon by many fine art collectors and the subject matter of her photographs—women and the pressures of domestic life—were hardly en vogue. Her work responds to her 1950s upbringing and the changing role of women in society. Carefully staged using actors and an interior setting, her 1979 photograph *Black Tablecloth* references such issues using graphic color, shape, and line.

Writing about Art

Have you ever collected something? What types of objects have you collected? If you could collect one of the three aforementioned photographs, which would you choose and why?

Divide the class into teams of two and ask students to discuss the three photographs with their team members. They should consider the photograph's important contribution to art, history, or science. Students should use the photograph's unique position within the fields of art, history, and science as an outline for developing their opinions. Each student should argue his or her case to their teammates, arrive at a conclusion, and translate their findings into writing.

Reflection

Find a team who chose the same artwork as you did. Share arguments with one another and discuss the values of each. Join another team of students that chose a different photograph. Present your side to the other team and discuss the values of as well as challenges to the other team's argument.

Curriculum Connection

Extend the lesson into a research project about the history of photography and its unique position within art, history, and science. Students may choose a photographic device (such as the Polaroid camera) or process (such as color photography) and explore its importance to the growth of photography. How did this time invention change the trajectory and potential of the medium? How has this device or process impacted us today? Combine students' research to create a classroom timeline of photography.

Classroom Activity

A Series through Time & Space

Enduring Understanding	Artists often create photographs to capture change over time.
Grades	9–12
Time	One to two class periods
Art Concepts	Line, shape, texture, composition, perspective
Materials	Digital cameras (or smartphones), projector, camera/projector-compatible cable. Optional: projection screen, computer.

Talking about Art View and discuss the printed image of *Surf Sequence* (1940, printed after 1972) by Ansel Adams.

What do you see? What types of lines, shapes, and textures do you notice? Discuss the composition, or arrangement of lines, shapes, and textures on the page. How does the composition change from one photograph to another? What might these compositions represent?

The photographer Ansel Adams is best known for his spectacular photographs of natural scenes and this series of photographs, entitled *Surf Sequence*, is no exception. Adams created this series in 1940 while on a trip along the Northern California coast. Standing at a perspective above the water, he turned his camera down at the surf line and captured the quiet and poetic movements of the water along the sand. A master of the technical aspects of photography, his practice represented a unique combination of mechanical execution and creative expression.

Imagine that a single photograph from *Surf Sequence* was presented alone, without the context of the other four photographs. How would this change your understanding of the work? What if you changed the sequence of the photographs? Would it impact the message or mood evoked by the series?

The photographic series represents an important tool for photographers. It emphasizes the element of space and showcases the element of time. Used by photographers and writers alike, a series can be used to document change, sequence, and trajectory.

Making Art Choose a place near the classroom or the school that is characterized by rapid change over time. You might choose the playground, where students can be seen running in circles, or an adjacent street, where cars rush by. Form a team of fellow photographers and talk about different ways to document the action unfolding before you. What are the different perspectives you can take around the moving subject? How can you incorporate motion into the way you capture your images?

Each team member should take a different perspective around or inside the space occupied by the subject(s). One person can stand at the perimeter to photograph while another person might stand in the heart of the action. Choose a different perspective or place from which to photograph and capture as many photographs as you can over a short span of time. Try a rhythmic motion, such as up-down, side to side, diagonal, or circular as you hold the camera to capture your images.

Regroup as a team and share your perspectival photographs with each other. Have each team member select one photograph from their particular camera roll—a photograph that best captures the subject(s) and that complements the others photographs in the series.

Reflection

Have teams upload their serial photographs to a central computer and project each series for display in the classroom. Compare and contrast the different subjects that students chose. Facilitate a constructive critique using the following questions to help students analyze their artistic choices:

What rhythm does this series evoke?

What mood is evoked by this rhythm?

How did the photographer connect with the rhythm of the environment?

Curriculum Connection

Compare the time-based media of photography to historical concepts of change over time. How has evolution impacted history, politics, and societies? How has evolution impacted science, species, and the environment? How might one use the medium of photography to explore or explain evolutionary concepts in history and in science?

Light, Perception, and Photography

Timeline

5 th Century BCE	Chinese philosopher Mo Ti recorded the creation of a device in which the light rays of an illuminated object pass through a pinhole into a darkened room and result in an inverted but otherwise exact image of the object. He referred to this device as a "locked treasure room."	1849	David Brewster invented the lenticular stereoscope (device for viewing a pair of separate images, one for each eye), and a binocular camera, leading to a craze for stereoscopic photography.
4 th Century BCE	In Greece, Aristotle described viewing the crescent shape of a partially eclipsed sun projected on the ground through the leaves of a tree, thereby describing the optical principle of a pinhole camera.	1861–65	The American Civil War was the first conflict to be thoroughly photographed. The thousands of photographs made of the Civil War brought images of the realities of modern warfare to the general public.
10 th Century CE	Arabian scholar Ibn al-Haytham Alhazen provided early analysis of various optical phenomena through his observations that an image was sharply defined when the aperture through which it was projected was small, and that the image became diffused as the hole was enlarged to admit more light.	1860s	Photography became a significant tool for the United States government and railroad companies in the efforts of survey teams to document relatively unknown parts of the continent. For the first time, landscape documentation emerged as a viable livelihood for a small group of American photographers.
1490	Leonardo da Vinci provided clear descriptions of the camera obscura (Latin for "darkened room") in his notebooks. Camera obscuras had become familiar to scientists, magicians, and artists during the Renaissance as many descriptions of the device are found from this period.	1872	Eadweard Muybridge was commissioned by former California Governor Leland Stanford to photograph his horse trotting. Refining the use of shutters to record actions during the split-second when the shutters were open, Muybridge's studies in motion throughout the 1870s—of horses galloping on a track and of men vaulting over poles—are considered the precursor to the invention of motion pictures.
1839	Multiple inventions were made public that laid the groundwork for photography. In France, Louis Jacques Mandé Daguerre unveiled detailed, unique, and lasting images on sheets of silver-plated copper; these images contained such accuracy that they were called "a mirror with a memory." The process came to be called "daguerreotype." In England, William Henry Fox Talbot presented calotypes. These were images on paper created from a negative made by covering paper with a silver salt solution and exposing it to sunlight. (The term "calotype" is from the Latin phrase that means "beautiful impression.")	1880s	In Europe and the United States, groups of photographers established societies that were devoted to promoting photography as fine art. Known as Pictorialists, they created highly expressive images. The subject matter of their photographs often drew from mythology and literature and their photographic techniques included soft focus imagery, atmospheric lighting, and printing on textured paper. In addition to creating groups, these photographers utilized exhibition spaces and published magazines to increase the awareness of photography's artistic potential.
1844	Talbot published the first of six installments of his book <i>The Pencil of Nature</i> .		

- 1888 George Eastman Kodak introduced the hand-held Kodak camera and marketed it in the United States. The first camera designed for recreational purposes, it provided a relatively inexpensive way to take pictures. Amateur photography flourished in the following decades as thousands of people began taking snapshots of the world around them.
- 1925 A small, light, and fast camera called the Leica allowed photographers to capture the activity of street life with greater accuracy and imagination.
- 1925 László Moholy-Nagy published *Painting Photography Film*, which advocated for the camera as a modern graphic tool and the creative use of new visual media—such as photography and film—within the global and mechanical modern world.
- 1932 In California, a group of photographers who shared a common photographic style based on precise images of natural forms and found objects created a group called f/64. The name referred to the smallest aperture (“f-stop”) setting on a large format camera and the one which allows a great depth of field. These photographers advocated for a realist aesthetic with sharp focus images and utilized contact printing on glossy paper.
- 1935 During the Great Depression, the Farm Security Administration of the U.S. government commissioned eleven photographers to travel throughout the country and document the conditions faced by farmers who suffered through drought and economic depression. Pictures by photographers such as Dorothea Lange, Arthur Rothstein, and Walker Evans have become enduring images of this period.
- 1936 The cover of the first issue of *Life* magazine features a photograph of Fort Peck Dam by Margaret Bourke-White, whose career included images ranging from industrial photography to portraits of world leaders.
- 1955 Edward Steichen’s landmark exhibition *The Family of Man*, highlighting the universality of human experience through over 500 photographs, opened at MoMA and subsequently toured the world for eight years.
- 1962 John Szarkowski succeeded Edward Steichen as curator of photography at MoMA. His 1966 exhibition *The Photographer’s Eye* (and publication by the same name) showcased the range of photography through its history.
- 1976 Los Angeles residents Marjorie and Leonard Vernon began to collect photography.
- 2008 LACMA acquired the Marjorie and Leonard Vernon Collection of photography.

About the Vernon Collection

In 1976, when Los Angeles residents Marjorie and Leonard Vernon began to collect photography, it was not widely collected by major museums or fine art collectors. The Vernons built a collection of some 3,600 photographs spanning the entire history of photography through careful research of photographers and of the medium and through their understanding of the centrality of photography in modern visual culture. Championing photography as a significant part of human expression, the Vernons fostered a community of photography enthusiasts and generously shared their home and their knowledge of photography with this expanding circle. In 2008 the Vernon collection of photography became part of the permanent collection of the Los Angeles County Museum of Art, thereby allowing the museum to present the history of photography alongside the museum’s larger encyclopedic collection of art from many cultures and time periods.

Sources

Britt Salvesen, *See The Light—Photography, Perception, Cognition: The Marjorie and Leonard Vernon Collection* and Naomi Rosenblum, *World History of Photography*. Third Edition.

Credits

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