

With the widening of I-35 through Norman, the City saw an opportunity to represent unique aspects of the community through artwork on the bridges. A

residents' committee worked with the artist, Steve Weitzman, and Oklahoma Department of Transportation officials to come up with the eight designs to be used on the bridges through Norman. *Horses in Motion* was the first of the art installations. Rock Creek Road was connected over the interstate. It was locally referred to as "the bridge to nowhere" for a time as the bridge was completed before the connections were made on either side.

Glenn Cannon, Jane. "Interstate 35 Bridge Artwork to Tell Norman's Story in Pictures, Symbols." NewsOK.com, 7 Dec. 2010, newsok.com/article/3521654.

About the Artist

Mr. Weitzman has been a professional artist since 1971. While he works with many mediums, many of his most famous pieces are sculptures and infrastructure aesthetic projects. He is the inventor of Fotera which "is [a] structural concrete or resinous terrazzo produced from a unique process to cast any image or design in full color." To learn more about the artist, visit his studio's website: www.weitzmanstudios.com



Symbolism of the Bridge

The horses symbolize the west Norman quarter horse breeding and saddle making industries.

The artist used deep relief to create shadows and the illusion of horses stacked in front of each other. The horses do not reflect one breed to allow the viewer to reflect on the impact of the horse in this area





The alternating cross-hatched textured squares are to depict a diamond shaped Native American quilt. The quilt design represents a saddle blanket tying into the overall theme.

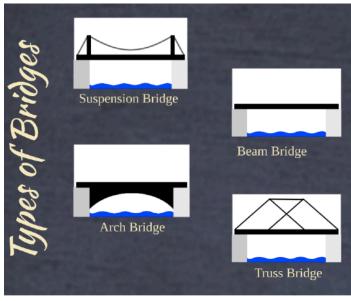
On the bullnose and termini, a concho is represented. A concho is a metal disk, often silver, originally used for a utilitarian purpose on saddles and now more common for decorative purposes. A nod to the cowboy culture and iconography is given with this symbol.



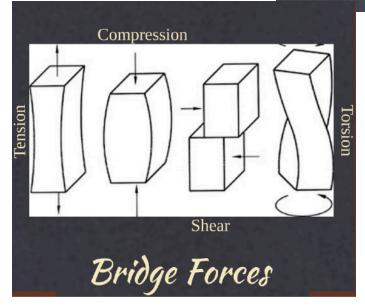


The woven leather look portrays the handpressed pattern of cowboy saddles.

Bridge Basics









Lesson Plan for Bridge Building

Written by Anjali Mulchandani

Introduction/Background Info

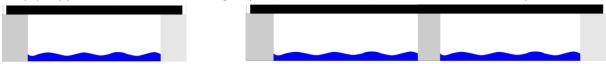
Bridges are structures built to get from point A to point B when the land in between is inaccessible. The earliest bridges were simply logs laid across a stream or stones creating a path across a river, and grew to be more advanced by weaving together combinations of sticks, logs, branches, weeds and other fibers to form ropes capable of holding together bridge materials. These simple ideas were the foundations of the beam designs used in modern culture. Bridges today are made of wood, concrete, and/or steel and have many different structures. Some examples include beam, truss, cantilever, arch, suspension, and cable.

Student Objectives

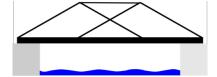
Through this activity, students will learn the basic design of bridges and which structures are the most stable and efficient in terms of the amount of material used.

Topics/Vocabulary

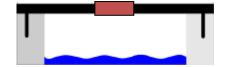
• **Beam Bridge.** The simplest design, a horizontal beam spanning between two regions; it can either be simply supported (beam across a single span) or continuous (beams across 2 or more spans).



• *Truss.* Structure of connected elements forming a triangle. Truss bridges are structurally stable because the forces are distributed throughout the triangle.



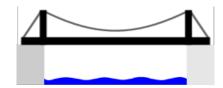
 Cantilever. Horizontal beam supported only on one end. Most cantilever bridges have 2 cantilever beams coming from opposite directions and connected by a suspended span in the middle.



 Arch. Horizontal beam with structures on both end where the load is distributed



 Suspension Bridge. Bridge suspended from cables that are attached to large towers that are implanted deep into the floor of a lake or river.



Overview of Lesson Process

- Intro (5 mins): Talk about the different types of bridges, see if they can match the famous bridges to what structure/type they are. Ask which design they think will be the most structurally stable. Then, introduce the activity. Answers: (top left) Arch; (top right) Cantilever. Notice the small suspended span in the middle; (middle) Suspension; (bottom left) Truss; (bottom right) Beam.
- Activity (30-40mins): Split into groups of 3 or 4 and build 2 different bridges truss and beam. These
 are the simplest kinds of bridges and will aid in understanding why some structures and shapes work
 better than others.
- Testing (10-15 mins): Test the bridges. You can do this either with the individual groups or everyone together. If there is a time crunch, then do it within the individual groups.
- Wrap-up (10 mins): Ask which bridge worked best and why. Clean up.

Materials

- Marshmallows: 48 per group (\$3 for 16 oz. bag)
 - Keep the marshmallows in an airtight bag so they don't get stale
- Round Toothpicks: 83 per group (\$1.50 for 250)

Procedures

Phase 1. Making the bridges

Give students the materials and plan sheets for both bridges. Tell them that the best method to make
the bridges is to assemble the 2 sides, then add the top and bottom. Work from left to right across the
plan, making sure to not miss any toothpicks.

Phase 2. Testing

- Have the kids place 2 chairs next to each other with some gap in between. Lay the bridge across the chairs. Then, slowly push down on the bridge. The marshmallow bridges are pretty weak and will cave almost immediately without any pressure. When the bridge breaks, notice whether it has just come apart at a joint or a toothpick has snapped. Also notice how the squares have turned into rhombuses, but the triangles have remained the same shape.
- For the second bridge, pile the books on in the same order so the "weight added" remains the same.

Phase 3. Conclusion

Go over concepts in conclusion section

Conclusion: "What Makes a Bridge Good?"

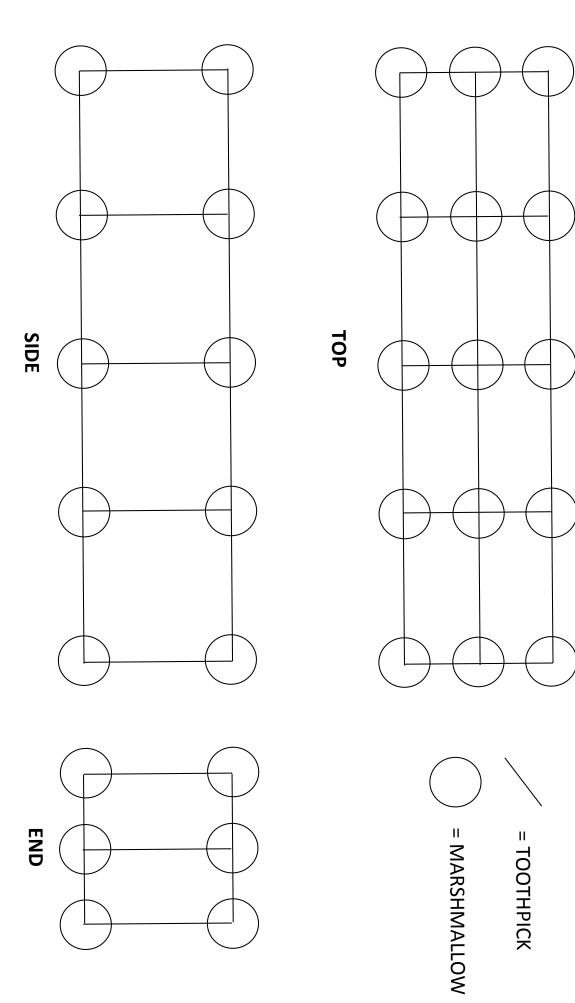
- Even Weight Distribution
 - Want weight to be borne by the entire structure, no stress concentrated at a single point.
 - Stress = Force/Area. By increasing the load bearing area, the stress at each point is reduced.
 - Want weight to be transmitted from the center of the bridge outward towards the base (contact points with the chair).
- Trusses (Triangular Units)
 - o Direct weight (stress) toward the corners of the triangle.
 - Triangles are strong bases because their geometry is fixed/locked in place: triangles cannot be squished/deformed without changing the length of the sides.
 - o Squares elongate/stretch to become diamonds, triangles don't have this flexibility
- Small Repeating Units
 - o Build the bridge from smaller repeating units, adds stability and allows for symmetry
- Symmetry
 - Allows for even load distribution
 - Bridges must maintain good strength at every point. If there is a single weak spot, the bridge will buckle.

Resources

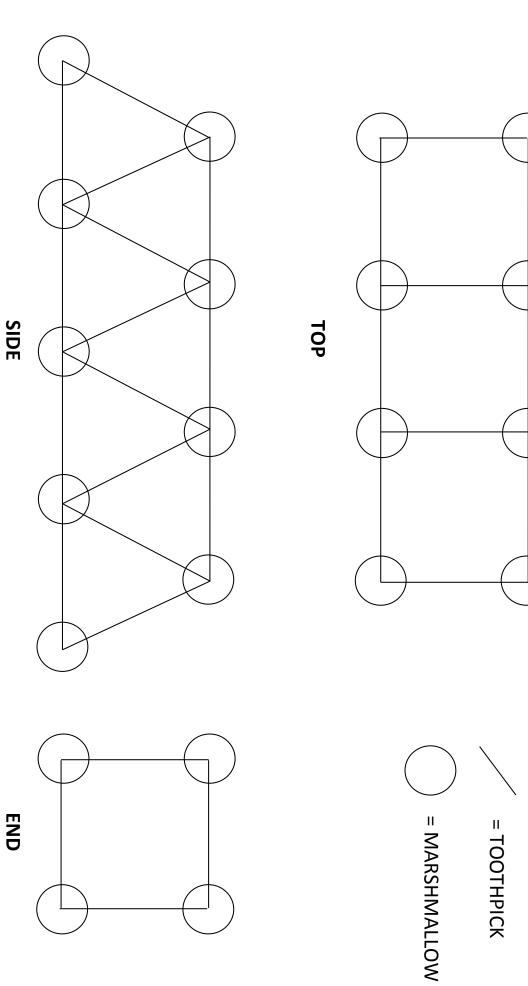
UC Berkeley BEAM Lesson: http://beam.berkeley.edu/node/793

Gumdrop Bridges: http://kansasenginerd.hubpages.com/hub/Gumdrop-Bridges

BRIDGE PLAN #1



BRIDGE PLAN #2













Additional Bridge Resources



PBS Building Big

Complete the bridge building challenge.

https://goo.gl/K1DJHG



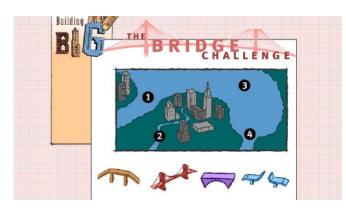
Teach Engineering

Curricular unit on Bridges http://goo.gl/ic73gd

Design Lab

Amazing information and active lessons on bridges

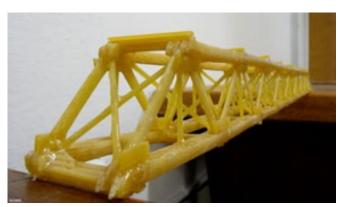
http://goo.gl/iwG13Z



Westpoint Bridge Designer

Download software to help you build and test your bridge model.

http://goo.gl/9PvJe8





Weave a Paper Basket



Supplies:

- butcher paper, packing paper or gift wrap
- · sewing machine, thread
- paper clips
- · hot glue

Instructions:

- 1. Fold pieces of paper into 1" strips.
- 2. Sew along the edge (or glue).
- 3. Weave the strips, starting with a bottom panel, then going up the sides. Use paper clips to temporarily hold strips in place.
- 4. Secure strip ends with glue.

http://www.designsponge.com/2012/01/sewing-101-recycled-paper-basket.html



Hand-Pressed Woven Horse Saddle

The sides of the pier sets look like the woven pattern hand-pressed into the leather of horse saddles. This activity will provide an opportunity to experiment with the art of



Explore Art: Charles Russell



Montana's Charlie Russell



About Visual Thinking Strategies (VTS)

Developed first as a way to engage students in analyzing fine art, this technique uses "openended questioning and student-centered facilitation techniques, including strategies for listening and paraphrasing, to create student-driven and engaging group discussion environments." It also engages "students in discourse . . . with an emphasis on providing evidence while considering and building off the contributions and perspectives of their peers." (http://vtshome.org/what-is-vts/)

Learn more about VTS, and watch experienced teachers use the technique with different age groups, from kindergarten to adults, at http://vtshome.org/.

Directions for VTS

Give students time to observe the image individually and silently (1-2 minutes).

Question #1: "What is going on here?"

It is important to ask this question just as you see it written. Once a student volunteers to share what he or she sees, paraphrase his or her answer: "I hear you saying..." You can also have a student expand on what he or she sees by asking:

Question #2: "What do you see that makes you say that?"

Again, paraphrase the best you can the student's answer before moving on to the next student.

After about 5 minutes or so, if things start to become quiet, ask:

Question #3: "What more can you find?"

It is important to ask in this same way, as it doesn't leave the observation to be only with the eyes (as in what more can you see), but opens it up to emotional and other senses also.

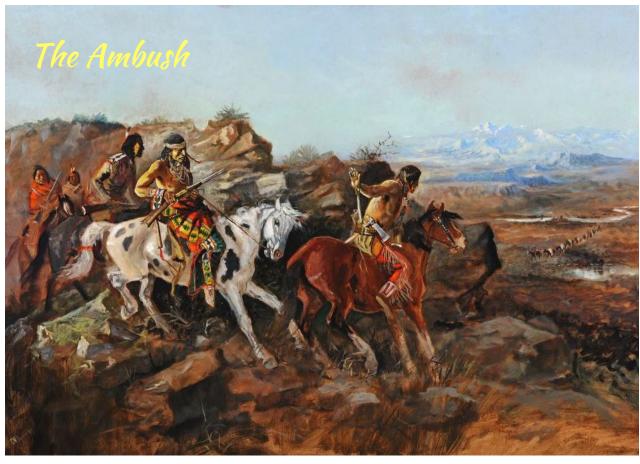
Again, paraphrase student answers before asking (if relevant):

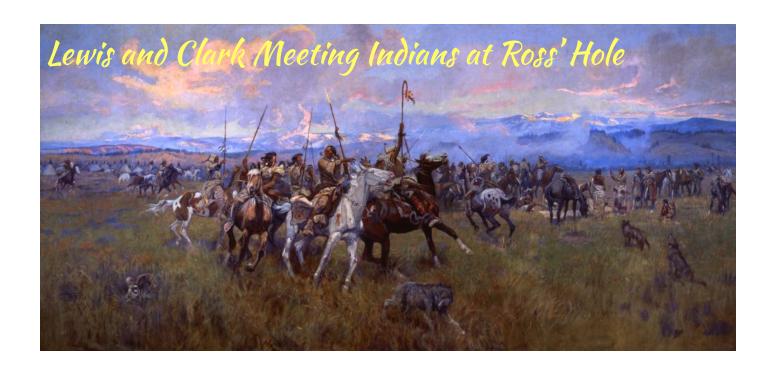
Question #2: "What do you see that makes you say that?"

Plan on spending about 15 minutes discussing an image, and understand that there will be some silence as students think of what else they can find.

https://goo.gl/BWCnoH

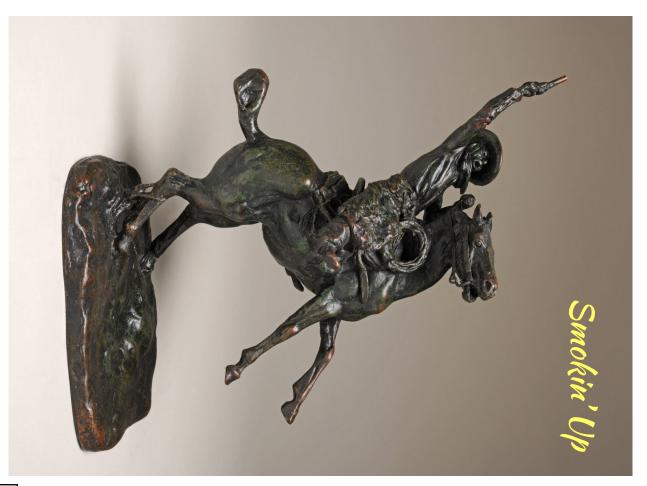












Measuring Horses

- 1. Watch the video, *How to Measure a Horse in Hands* (https://youtu.be/R2h9mM4hGzk), that explains how measuring in "hands" is done.
- 2. Have the students measure each other in inches.
- 3. Have the students convert their height to hands.

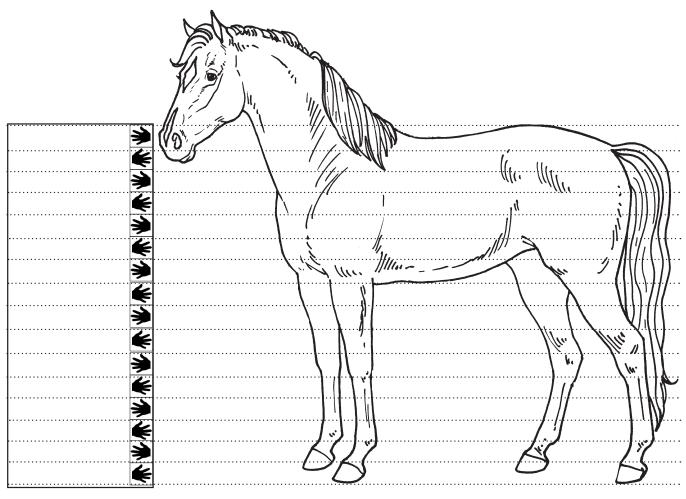
Extra: Give the students a horse height in hands. Have them convert to inches and mark on the wall with tape the height.



Visit https://goo.gl/Mguo7S for a full lesson plan. An optional worksheet follows

A Handy Measure

Horses are measured by the hand, from the ground to the withers. The withers is the high part of the horse's back, between the shoulder blades. The average width of a man's hand is four inches. A horse must be 14.2 hands tall to be called a horse. Anything shorter is a pony.



- 1. Count the hands in the picture above. The animal in the picture is _____ hands tall. Is it a horse or a pony?_____
- 2. Stand with your back to the wall and get your partner to place tape on the wall just above your head. Use a yardstick or meter stick to measure from the floor to the tape. How tall are you?______.
- 3. Draw a picture of yourself in the space below, at left. Use the hands to draw yourself at the correct height.
- 4. On another sheet of paper, trace your hand. Use a ruler to measure the widest part of your hand below your fingers. How wide is your hand? ______
- 5. Use your hands to measure. How many hands tall are you?____ hands



The Geometry of Quilts

Instructions

1. Take 12 squares in one color and 12 squares in another color.

Let's say blue and yellow, but you can use any two colors.

2. Cut 4 blue squares and 4 yellow squares in half diagonally.

Now you have 16 triangles, 8 blue and 8 yellow. You also have 8 blue squares and 8 yellow squares left, right?

3. Paste a blue triangle on each yellow square and a yellow triangle on each blue square.

Now you have 16 squares made up of half square triangles.

4. Take 2 squares.

How many different ways can you put them together? Is it different than when you tried this with just lines?

- 5. Try it with 4 squares.
- 6. Try it with 16.
- 7. What happens if you add more colors?

https://goo.gl/4Bt2wP



Geometry for Kids: Quilt Activity Using Triangles

Easier

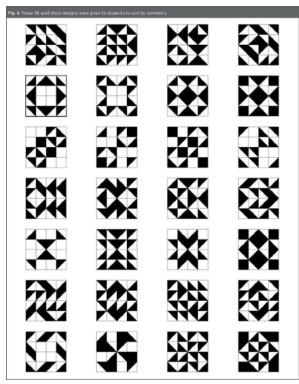






Quilt Block Symmetries

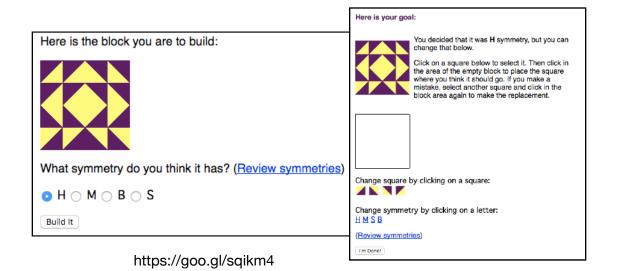
"Inquiry-based learning activities targeting transformational geometry.





https://goo.gl/2h66Ra

Online Activity: Space and Shape in Quilts





These done activities can be lif preferred, there is a article available on the world site.

These done activities can be perferred, there is a article available on the wonderopolis site.



Read nonfiction articles about horses and quilts. There is an interactive vocabulary activity and reading comprehension questions.

How Strong Is a Horse?

https://wonderopolis.org/wonder/why-do-horses-wear-shoes



How Do Quilts Tell Stories?

Wonder of the Day #124

Wonder of the Day #1571

Why Do Horses Wear Shoes?

https://wonderopolis.org/wonder/how-strong-is-a-horse

Horse Idioms

Draw the Idiom

- · Give each student an idiom strip.
- Have them draw a picture of the literal meaning of the words.
- · Have the students see if they can guess the meaning of the idiom (or if they already know).
- Then, have the students look up the meaning in an idiom dictionary, look it up online or give them the meanings included.
- · Have the students draw a second picture of the meaning of the idiom.
- · Students share both pictures.

Act out the Idiom

- Give each student/pair of students a strip.
- Then, have the students look up the meaning in an idiom dictionary, look it up online or give them the meanings included.
- . Have them act out the meaning of the idiom after sharing the idiom with the class.
- · The class discusses the meaning.

https://wonderopolis.org/wonder/how-do-quilts-tell-stories

ldiom/Saying	What It Means
Hold your horses	Wait a moment
You can lead a horse to water, but you can't make it drink	You can give someone an opportunity but you can't make them take it
A horse of a different color	Unrelated matter
Eat Like a Horse	Eat a lot
Dark horse	A little known candidate that rises to win a competition
Charley horse	A cramp in the arm or leg
a Trojan horse	A person or thing intended secretly to undermine or bring about the downfall of an enemy or opponent.
Wild horses couldn't drag me away	Being determined to stay with something
Horse around	Fool around
Hoofing it	To walk or to dance
Don't look a gift horse in the mouth	To find fault with something that has been given to you
Horseplay	Rough and loud play
Beat a dead horse	Waste energy on something that isn't working out
Get off your high horse	To tell someone to stop acting superior
One Horse Town	Very small town
Chomp/champ at the bit	Anxious to get started
Don't put the cart before the horse	Don't do things in the wrong order
Get back on the horse	To start again
Horse sense	Common sense
Straight from the horse's mouth	To hear something directly from the person that knows

Hold your horses	Horseplay
You can lead a horse to water, but you can't make it drink	Don't look a gift horse in the mouth
A horse of a different color	Beat a dead horse
Eat like a horse	Get off your high horse
Dark horse	One horse town
Charley horse	Trojan Horse

Chomp/champ	Don't put the cart
at the bit	before the horse
Wild horses couldn't drag	Get back on the horse
me away	
Horse around	Horse sense
Hoofing it	Straight from the horse's mouth



Pigment Properties of Plants

The quilts depicted on the slope walls are representative of the Native American quilts. Before the invention of synthetic dyes, all fabric was dyed using plants.

Watch the video, *The Chemistry of Natural Dyes.* https://youtu.be/Gwk1B66dvAM

Directions:

1. Talk to children the day before the lesson about the importance that natural plant dyes had in early America and touch on the science involved in natural dye making.

2. Place beets, spinach, onion skins and black

2. Place beets, spinach, onion skins and black walnuts in separate crock pots and barely cover with water.

3. Heat the crock pot on low overnight.

4. In the morning, the crocks will have natural dye that you can pour into little bowls.

5. Dye cotton squares to use in a class quilt.

Extend the lesson and additional historical insight https://www.gardeningknowhow.com/special/children/natural-plant-dyes.htm

Materials Needed:

4 crock pots

Beets

Spinach

Dry onion skins

Black walnuts in shells

Fabric (muslin squares would work well)

Some additional background information

Native Dyes https://goo.gl/BXtd8z

Scientific America: Staining Science https://goo.gl/7mhjkD

The Science Involved https://goo.gl/awFpi8

Equine Science for Kids

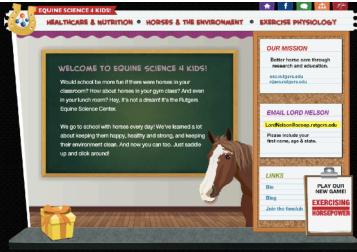
http://esc.rutgers.edu/kids/portal.html

This website is full of information on equine science. Have students play the informative



"Exercising Horsepower" with different horses.

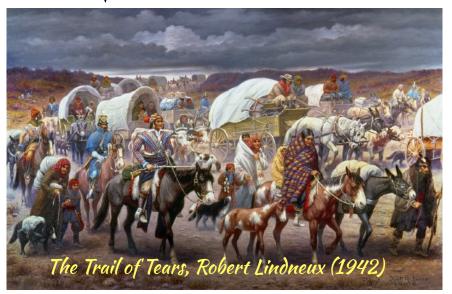
Have them compare their results.



http://esc.rutgers.edu/kids/games/exercise/

The Trail of Tears

Show these two pieces of art depicting the Trail of Tears. Have students brainstorm what they think is happening and what emotions are involved. Then have them read some or all of the accounts listed. Regroup and discuss what the Trail of Tears was and what impact it had on Native Americans and the country as a whole. Have students draw or write about the Trail of Tears.



The End of the Trail, James Earle Fraser

Five Family Stories from the Trail of Tears at the American Native Press Archives and Sequoyah Research Center.

https://goo.gl/QNAn67

Primary Sources: A Soldier's Account of the Cherokee Trail of Tears. Newsela allows you to level for different reading abilities.

Educators can create a free account. https://goo.gl/j3Tpki

Edward S. Curtis' The North American Indian

Primary Source photos of Native Americans show the role that horses played in their lives.

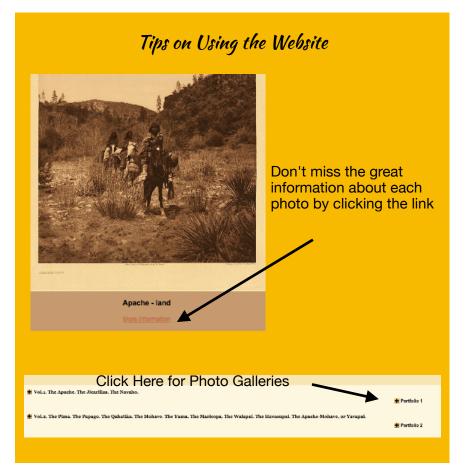
Show the students the photos shown here.

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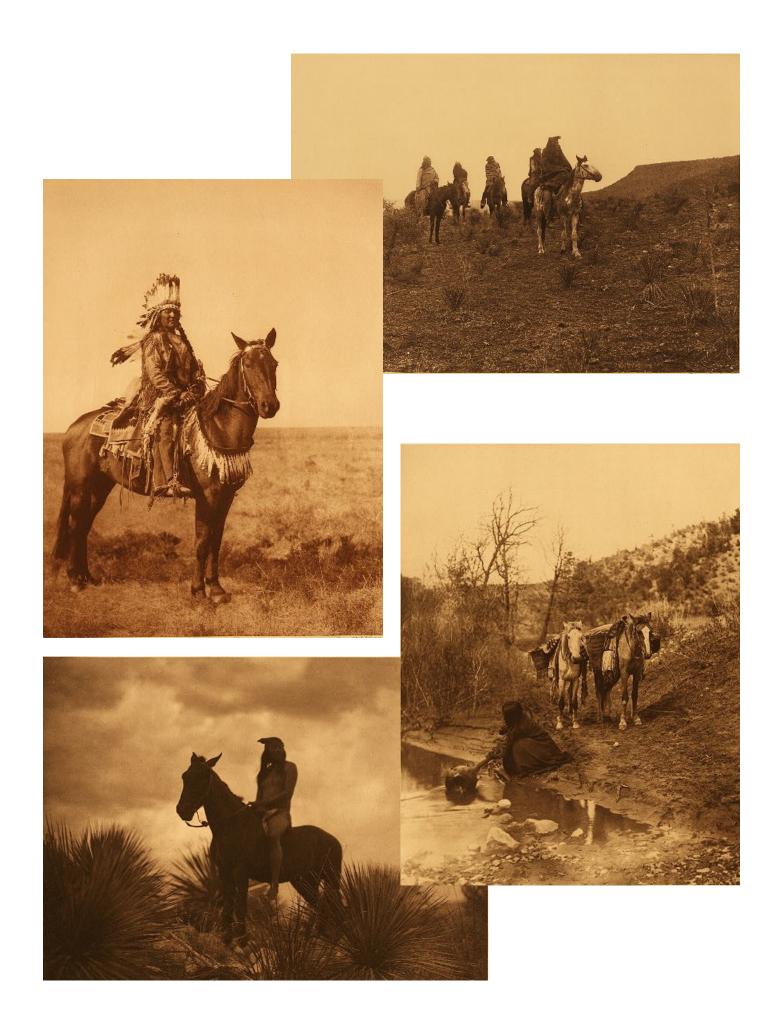
Give students the opportunity to find a photo that interest them in the collection.



http://curtis.library.northwestern.edu/curtis/toc.cgi



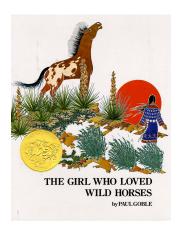
- 1. What do you see in the photo?
- 2. Why do you think this photo was taken?
- 3. What questions do you have when looking at this photo?
- 4. Are the questions you have ones that there is information available to answer? Or are the answers lost to time?



Horses in Motion

RELATED BOOKS

Picture Books

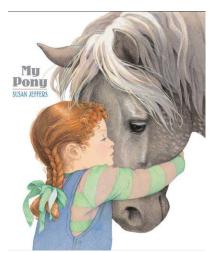


The Girl Who Loved Wild Horses

By Paul Goble
Winner of the 1978 Caldecott Award

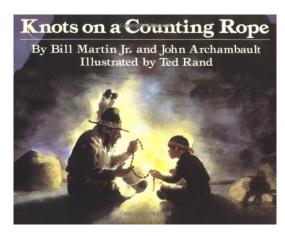
"In a nomadic community, horses play an important role in daily life, but one girl shows a stronger affinity for the horses than anyone else in her tribe. She cares for the horses, knows their favorite places to graze, and heals them when they're hurt. One peaceful day, while she rests among the horses, a sudden thunderstorm disturbs the herd and she is swept away with them to a land far from her family.

A wild stallion, the leader of the wild horses, welcomes the girl and her horses into his herd and together they roam the hills, free and happy. When hunters from her community finally discover the girl after months of searching, they are overjoyed to find her safe and try to bring her home. The stallion fiercely defends the girl as one of his own, but she falls when her horse stumbles and the hunters are able to return her to her relatives. Though she was glad to see her parents and friends, the girl must ultimately make a choice. Will she stay with her people or return to her family of wild horses? www.scholastic.com



My Pony
By Susan Jeffers

A little girl who longs for a pony draws pictures of a dappled mare she names Silver, then rides her through a magical countryside in her dreams. At the heart of Susan Jeffers's exquisite picture book lies the idea that in her imagination, a child can journey anywhere and do anything- even fly through the stars on her very own pony... www.barnesandnoble.com

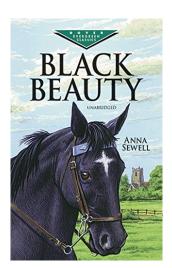


Knots on a Counting Rope

By Bill Martin Jr and John Archambault

A blind Native American boy named Boy-Strength-of-Blue-Horses begs Grandfather to tell the stories of the night he was born and of a great race. In this poignant story, the counting rope is a metaphor for the passage of time and for a boy's emerging confidence facing his greatest challenge: blindness.

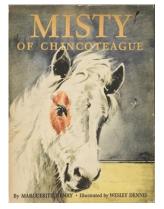
Novels



Black Beauty

By Anna Sewell

A handsome horse with a glossy black coat and a pretty white star on his forehead, Black Beauty seems to lead a charmed life. Although his mother warns him that there are 'bad, cruel men' in the world, he begins his life in a happy home, with a friendly groom to look after him and plenty to eat. However, when a change of circumstances means that he is sold, he soon discovers the truth of his mother's words. Anna Sewell's moving story is one of the best-loved animal adventures ever written.

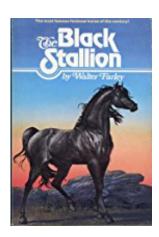


Misty of Chincoteague

By Marguerite Henry

On an island off the coasts of Virginia and Maryland lives a centuries-old band of wild ponies. Among them is the most mysterious of all, Phantom, a rarely seen mare that eludes all efforts to capture her--that is, until a young boy and girl lay eyes on her and determine that they can't live without her. The frenzied roundup that follows on the next "Pony Penning Day" does indeed bring Phantom into their lives, in a way they never would have suspected. Phantom would forever be a creature

of the wild. But her gentle, loyal colt Misty is another story altogether.



Black Stallion

By Walter Farley

First published in 1941, Walter Farley's best-selling novel for young readers is the triumphant tale of a boy and a wild horse. From Alec Ramsay and the Black's first meeting on an ill-fated ship to their adventures on a desert island and their eventual rescue, this beloved story will hold the rapt attention of readers new and old.

Horses in Motion

OKLAHOMA STANDARDS

Many standards only change in the depth and breadth as grade levels progress. Generally, standard numbers are given where the base standard applies although wording might be slightly different amongst grade levels.

VISUAL ARTS

STANDARD 1: Language of Visual Art: "Presenting" The student will identify and communicate using a variety of visual art terms.

STANDARD 2: Visual Art History and Culture: "Responding" The student will recognize the development of visual art from a historical and cultural perspective.

STANDARD 3: Visual Art Expression: "Creating" The student will observe, select, and utilize a variety of ideas and subject matter in creating original works of art

2. Use a variety of subjects, basic media and techniques in creating visual art including drawing, painting, weaving, sculpture, ceramics, collage, and mixed media.

STANDARD 4: Visual Art Appreciation: "Connecting" The student will appreciate and utilize visual art to make interdisciplinary connections and informed aesthetic decisions.

MATH

- 3.GM.1 Use geometric attributes to describe and create shapes in various contexts.
 - 3.A.1.3 Explore and develop visual representations of growing geometric patterns and construct the next steps.
- 4.A.1 Use multiple representations of patterns to solve real-world and mathematical problems. 6.GM.4 Use translations, reflections, and rotations to establish congruency and understand symmetries.
 - 6.GM.4.4 Identify and describe the line(s) of symmetry in two-dimensional shapes.
- 3.GM.2 Understand measurable attributes of real-world and mathematical objects using various tools.
- 4.GM.2 Understand angle, length, and area as measurable attributes of real world and mathematical objects. Use various tools to measure angles, length, area, and volume.

- 5.GM.3 Understand angle and length as measurable attributes of real-world and mathematical objects. Use various tools to measure angles and lengths.
- 6.GM.3 Choose appropriate units of measurement and use ratios to convert within measurement systems to solve real-world and mathematical problems.

LANGUAGE ARTS

3.2.F.2, 4.2.F.2, Students will orally read grade-level text at an appropriate rate, smoothly and accurately, with expression that connotes comprehension.

3. 4.R.1, 4. 4.R.1, 5. 4.R.1, 6. 4.R.1, 7. 4.R.1, 8. 4.R.1

Students will increase knowledge of academic, domain-appropriate, grade-level vocabulary to infer meaning of grade-level text.

3.3.R.4, 4.3.R.4,

Students will find examples of literary devices

5.3.R.4, 6.3.R.4, 7.3.R.4

Students will evaluate literary devices to support interpretations of literary texts

SCIENCE

Science And Engineering Practices

- 3. Planning and carrying out investigations
- 4. Analyzing and interpreting data

SOCIAL STUDIES

Process and Literacy Skills Standard 1

- A. Key Ideas and Details
 - 1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
- C. Integration of Knowledge and Ideas
 - 7. Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
 - 9. Compare and contrast the most important points and key details presented in two texts on the same topic.

Process and Literacy Skills Standard 2

- A. Text Types and Purposes
 - 2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

Process and Literacy Skills Standard 3

- A. Comprehension and Collaboration
 - 1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grade 3 Oklahoma Studies topics and texts, building on others' ideas and expressing their own clearly

3rd Grade, History Llteracy, Content Standard 4

5. Describe the migrations and settlements by Native Americans including the Trail of Tears.

4th Grade, Content Skills, Standard 2: The student will examine Native American groups and European explorations and settlements impacting the development of the major regions of the United States.

1. Identify the major Native American groups and their ways of life in each region including traditional housing and economic activities, customs and storytelling, viewpoints on land usage and ownership, and their contributions to American culture and history

Literacy Skills Standard 1

- A. Key Ideas and Details
 - 2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.

Public Art is SmART

Norman Arts Council

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