

Thematic Unit

Cave Paintings & Petroglyphs

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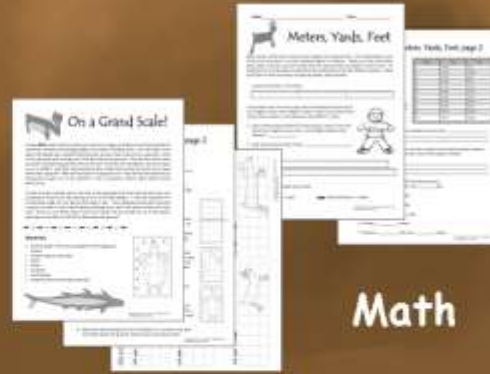
Read/Write ~ Travel Genre

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Art

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Math

Text in Two Levels ~ Grades 3/4, 5/6

Thank you for taking the time to check out these materials for the study of ancient rock art through the thematic unit, "Cave Paintings & Petroglyphs". This item contains the complete unit. I hope you'll find it exciting and educational!

Sandie Flynn

Reading Materials

Reading materials include

- A Tour Guide at 2 different reading levels: Orange—Grades 3-4, and Brown—Grades 5-6
- Vocabulary Bookmarks and Vocabulary Cards
- Comprehension and Study Worksheets



Writing Materials

Students will read, research, and then write a page for a class travel book that explains an ancient rock art "*Point of Interest*". Included are

- Sample "*Point of Interest*" cards
- Research directions
- Rough draft templates for student use
- A word processing template for student final draft publication
- You may use images from the art prints for the cover of the class book if you wish, since all the images are in the public domain, or personalize the included book covers.



Art Materials

Students will analyze images of rock art, and sort them into customary categories, just as paleoarchaeologists do.

- Game board
- Images to sort
- Game directions



Art Prints

8.5X11 sized prints of famous ancient rock art from around the world

Petroglyph Carving

Materials:

- pencil and paper
- sharp pencil
- coffee can with lid
- coffee can with lid
- colored pencil
- colored pencil
- colored pencil

Directions:

1. Cover your work area with newspapers. This will make it easy to clean up!
2. Shave the sand just enough so that it will hold a shape.
3. Dig a rock shaped hole in the sand. Make it about one inch deep and four to five inches wide and long.
4. After you have finished carving, use a cotton swab to highlight the hole. Dip the swab in the white part and gently pat it light to make your carved lines.

Petroglyph Painting

Materials:

- plaster of Paris
- coffee can
- tempera paint - brown, white, black, yellow
- sand in a seal bag or plastic bag
- paper paper 1/2

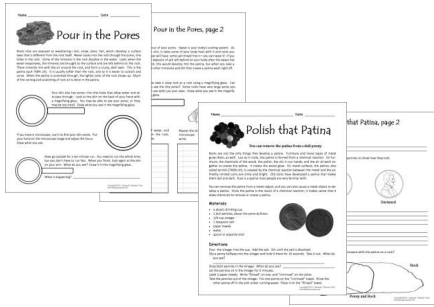
Directions:

1. Fill your cup about half full of plaster. Write your name on one end of your coffee stick. Use the other end to mix well.
2. Add water and stir a little at a time, until the plaster is about as thick as milkshake. Dip it straight into the coffee stick. You may need to work fast because plaster begins to harden very quickly.
3. Place the plaster mixture into the hole. Be sure it does to fill the space. Dip your stick in the sand next to your rock and mix well.
4. Add tempera paint to create the color of a black, gray, or brown rock. Mix it in.
5. Quickly cover the surface of your rock that you can see. You might want to pour the back as well. Be sure the edges are covered. Let it dry overnight.
6. Bend a long paper clip until it bends in half. Stick it in a hole. Press the paper clip into the plaster and paper in a hole. This is the hanger. Let it harden.
7. After a couple of hours, gently dig the "rock" out of the sand. Place off the back and let it dry. Write your name on the back. It will have several lines or marks for it to dry completely. There it will be some hard, just like the rock the native people carved!

Directions to

- Make a plaster rock
- Paint a patina on it
- Carve a design into the "rock"

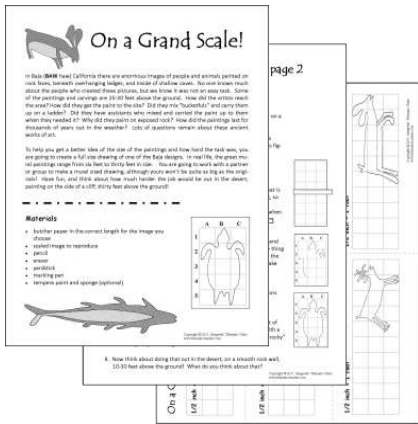




Science Materials

Two science activities include

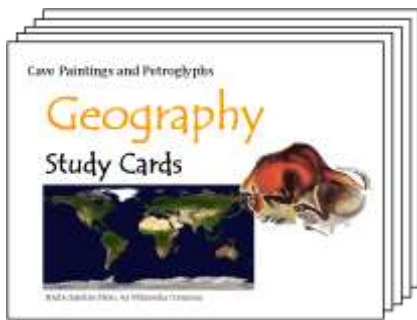
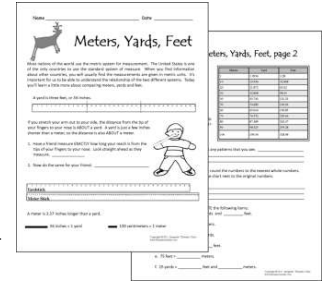
- *"Pour in the Pores"* which examines porous rock
- *"Polish That Patina"* which examines the coating rocks develop over time



Math Materials

Two math lessons cover

- *"Meters, Yards, & Feet"*: a comparison of standard and metric units of measure
- *"On a Grand Scale"*: shows how to turn a scaled drawing into a life sized image (This lesson may require adult supervision or very mature students. It always requires patience, but is one of my favorite lessons!)



Geography Materials

- *"Geography Study Cards"* allow students to practice identification of continents and land masses using satellite images. 1/4 letter size geography cards depict areas of the world containing ancient rock art
- Satellite map of the world identifies *"Points of Interest"* locations highlighted in the unit
- A blank map (11X17) where students can locate the rock site that is the topic of their *"Point of Interest"* article using a sticky dot (see sample below).



Cave Paintings & Petroglyphs



Vocabulary



Reading & Writing Worksheets



Poster

Student Readers:

Grades 3/4 & 5/6

Writing Models

Reading & Writing in the TRAVEL GENRE

Vocabulary Bookmarks

Cave Paintings and



Petroglyphs

Altamira: ALL tuh ME ra

Bhimketka: beem KET kuh

Blombas: BLOM bus

Chauvet: SHOW ven

Kakadu: kuh KAW doo

Lascaux: LAS coo

accessibility:

ack SESS uh BIL uh tee
how easy something is to get to or to use.

accommodation:

uh com uh DAY shun
a place to stay, such as a hotel.

amenities:

uh MEN uh tees
places that give comfort or convenience,
like a restroom, restaurant, or hotel.

crosshatch:

CROSS hach
A pattern that is drawn, painted, or
carved with diagonal lines crossing over
each other to form rhombus shapes.

engraved:

in GRAVED
to cut or press letters, words, or pictures
into a hard surface.

excised:

EX sized
a picture that is cut out from the rock. The
rock around the image is chipped away so
that the carving stands above the surface of
the rock.

Cave Paintings and



Petroglyphs

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into a hard surface.

excised:

EX sized
an image that is cut out from the rock. The
rock around the image is chipped away so
that the carving stands above the surface of
the rock.

image:

IM ij
a physical representation of a person,
animal, or thing that has been drawn,
painted, carved, or photographed.

incised:

IN sized
an image that is cut into the rock. The
surface of the rock stands above the
carving.

ochre:

OH ker
a type of stone which contains iron; it's
often reddish or greenish in color.

patina:

puh TEEN uh
a crust that develops on rocks or metal
surfaces as a result of a chemical reaction.
The rock below is often lighter in color.

petroglyph:

PET row glif
carving upon a rock
*Petros is the Greek word for stone.
The root "glyph" means "to carve."*

pictograph:

PICT uh graf
pictures painted onto stone
The root "pict" means painting.
The root "graph" means to write.

pigment:

PIG munt
liquid or powder made from natural mat-
erials that is mixed with water or oil to
make paint.

porous:

PORE us
full of pores—little holes that allow water
or air to pass through the covering or sur-
face of an object.



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Orange,
Grades 3/4

Brown, Grades 5/6

Cave Paintings & Petroglyphs
Vocabulary Cards



petroglyph

PET row glif

a carving upon a rock.

Petros is the Greek word for stone. The root "glyph" means "to carve."

Petroglyph = carving on stone



amenities

uh MEN uh tees

Features or places that give comfort or convenience, like a park, a restroom, a restaurant, or hotel.

accessibility

ack SESS uh BIL uh tee

How easy something is to get to or to use.



pictograph

PICT uh graf

a picture painted onto stone. The root "pict" means painting. You find it in words like picture and depict. A group of ancient Scots painted and tattooed themselves heavily, and were named "Picts." The root "graph" means to write. Pictograph= painted writing



accommodation

uh COM uh DAY shun

1. Changes made to something to make it easier for another person to use.
2. A place to stay such as a hotel.

image

IM ij

a picture of a person, animal, or thing that is



archaeologist

ARK ee AWL uh jist

a scientist who studies prehistoric people and cultures.



engraved

In GRAVED

to cut or press letters, words, or pictures into a hard surface.



ochre

OH ker

a type of stone which contains iron; it's often reddish or greenish in color.



crosshatch

CROS hach

A pattern that can be drawn, painted, or carved with diagonal lines crossing over each other to form rhombus shapes.



excised

EX sized

An image that is cut out from the rock. The rock around the image is chipped away so that the carving stands above the rest of the rock.



paleoanthropologist

PAY lee oh AN throw POL uh jist

a scientist who studies the ancestors of modern humans.



pigment

PIG munt

a liquid or powder made from natural materials that is mixed with water or oil to make paint.



porous

PORE us

full of pores—little holes that allow water and air to pass through the covering or surface of something.



Bhimbetka

beem BET kuh

The name of a group of caves in India believed to be the oldest rock shelters on earth. It was named after a local god, Bhima, who was said to sit on the rocks.

incised

IN sized

An image that is cut into the rock. The rock inside the image is chipped away so that the surface of the rock stands above the carving.



Chauvet

SHOW ven

a cave in France containing beautiful, painted images of dangerous, wild animals



patina

puh TEEN uh

a crust that develops on the top of rocks or metal surfaces as a result of a chemical reaction. It makes the surface of the rock darker in color than the rock that is below it.



hammer stone

HAM mer stone

hand sized stones used by ancient people as hammers.



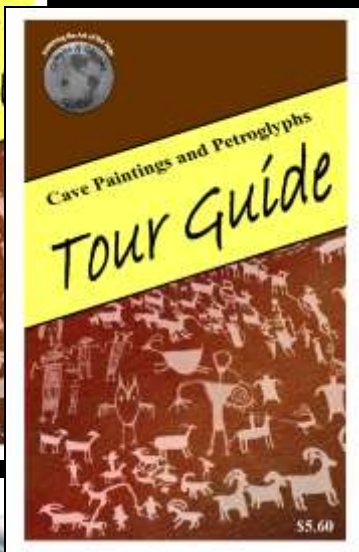
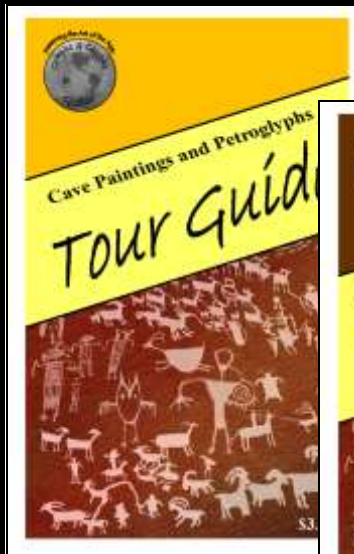
chisel stone

CHIZ uh stones

stones with sharp corners used to chip, peck, or cut out pieces of rock or wood.



Vocabulary Cards
for introducing new words,
practicing, and review



Canyon Pintado Rock art, Colorado: Photo by K. Armstrong, via National Science Digital Library (www.nsdlib.org).

Rock Art of the Ages

People have been leaving their mark on the world for as long as they have lived here. Long before the beginnings of written language, messages have been painted and carved into the very stone of the earth. How did it start? Why did these ancient people spend their precious time carving on rocks? What tools did they use? Did the images stand for words? Were they trying to communicate? What was it all about?

There are many unanswered questions regarding the ancient and beautiful pictures created thousands of years ago. It's amazing how these images, many of them sitting out in the wind and rain, have endured as long as they have, yet scientists have concluded that some of these first art works of mankind may be seventy-five thousand years old!

2

Rock art is either painted on, or carved, into the rock.

Pictographs

Pictographs (*PICT uh grafz*) are pictures painted onto stone. Many of these images were painted on rock that was sheltered from the weather, so they are often found inside caves, but a surprising number of them still exist on rock walls that are exposed to the weather. In Baja (*BAH hah*) California, there are hundreds of brilliantly colored, enormous, larger-than-life sized images. They are a living monument to a people long gone.

pict = "to paint"
graph = "to write."
pictograph = "painted writing"

Paints were made from natural materials including dirt, charcoal, stone, and plant juices. The dry materials were ground into powder, called pigment (*PIG munt*) and then mixed with water. Saliva, animal blood, or fat were added to the paint to help it stick to the rock. The wet paint was worked into the porous rock wall, which helped to embed it into the stone.¹



Primitive Artist: Photo by Edward S. Curtis, via the Library of Congress Edward S. Curtis Collection Reproduction Number LC-16262-49234 (b&w film copy neg.).

Paint was applied in a number of ways, using different tools. It could be dabbed on by hand. Brushes made of animal hair, plant fibers, and even tufts of lichen and moss were used. Straight lines were made with strong twigs and bones, and paint could even be sprayed onto the rock surface by blowing it through a hollow tube. Believe it or not, these resourceful people even made their own crayons! They dug iron out of the ground in clayish clumps. Pigments were mixed into it, and it was shaped to form a colored drawing stick.²

3

Student Reader: Tour Guide

Orange, Grades 3/4, Brown Grades 5/6

16 pages (4 pieces of letter sized paper, 2 sided)

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Primitive Artist: Photo by Edward S. Curtis, via the Library of Congress Edward S. Curtis Collection Reproduction Number LC-USZ62-49234 (b&w film copy neg.).

Paint was applied in a number of ways, using different tools. It could be dabbed on by hand. Brushes made of animal hair, plant fibers, and even tufts of lichen and moss were used. Straight lines were made with strong twigs and bones, and paint could even be sprayed onto the rock surface by blowing it through a hollow bone tube. Believe it or not, these resourceful people even made their own crayons! They dug iron out of the ground in clayish clumps. Pigments were mixed into it, and it was shaped to form a colored drawing stick.²

Yellow, white, black and red were common paint colors used by people around the world. Some cultures developed additional pigments.



Horses, Chauvet Cave, France: Photo, via Wikimedia Commons.

The paintings had to be protected from the weather. Rain could wash the images off the rock, and blowing sand and dirt could erode them away. The most sheltered area was inside a cave, but these ancient paintings can be found on exterior rock walls and on cliffs underneath overhanging ledges. It's absolutely amazing how they have endured through the years.

petros = “rock”
glyph = “to carve”
petroglyph = “rock carving”

Petroglyphs

Petroglyphs (PET row glifs) are rock carvings. They were usually pecked or scratched into the surface layer of the rock to form a groove (incised), but sometimes the surrounding layer of rock was chipped away to expose the picture as a raised image (excised).

Incised: cut into the rock



Petroglyphs, Pu'u Loa, Hawaii: Photo by A. Crane, via National Scenic Byways Online.

Excised: cut out of the rock



Petroglyph Replica: Photo by S. Flynn, Integrate! Thematic Units.

Name _____ Date _____



Using a Tour Guide Reading

Work together with a small group to answer the questions.

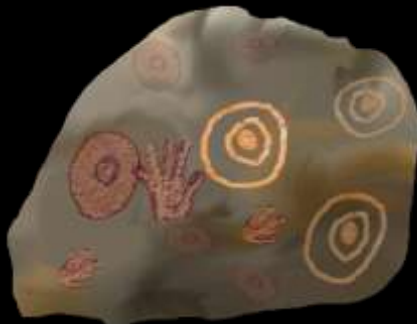
1. Why do you think the "Points of Interest" (interesting rock art sites around the world) are located AFTER the rock art information in the Tour Guide? _____
2. What are amenities? _____
3. List some amenities found at our school. _____
4. Describe the "Adventure Level" found in getting from your home to school. _____
5. Briefly describe "Accessibility Levels" for the following categories:
 Beginner _____
 Intermediate _____
 Advanced _____

6. Tell what these travel icons mean:



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Travel Genre Reading



Rock Art Comprehension

Name _____ Date _____



Rock Art Reading

Use the articles on rock art in the Tour Guide to help you answer the questions.

1. Why do you think the informational articles about rock art come before the travel articles in the Tour Guide? _____
2. What is a pictograph? _____
3. What is a petroglyph? _____
4. What do we mean by ancient people? _____

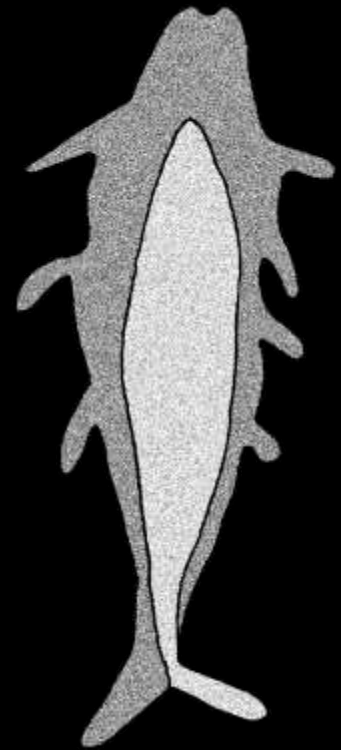
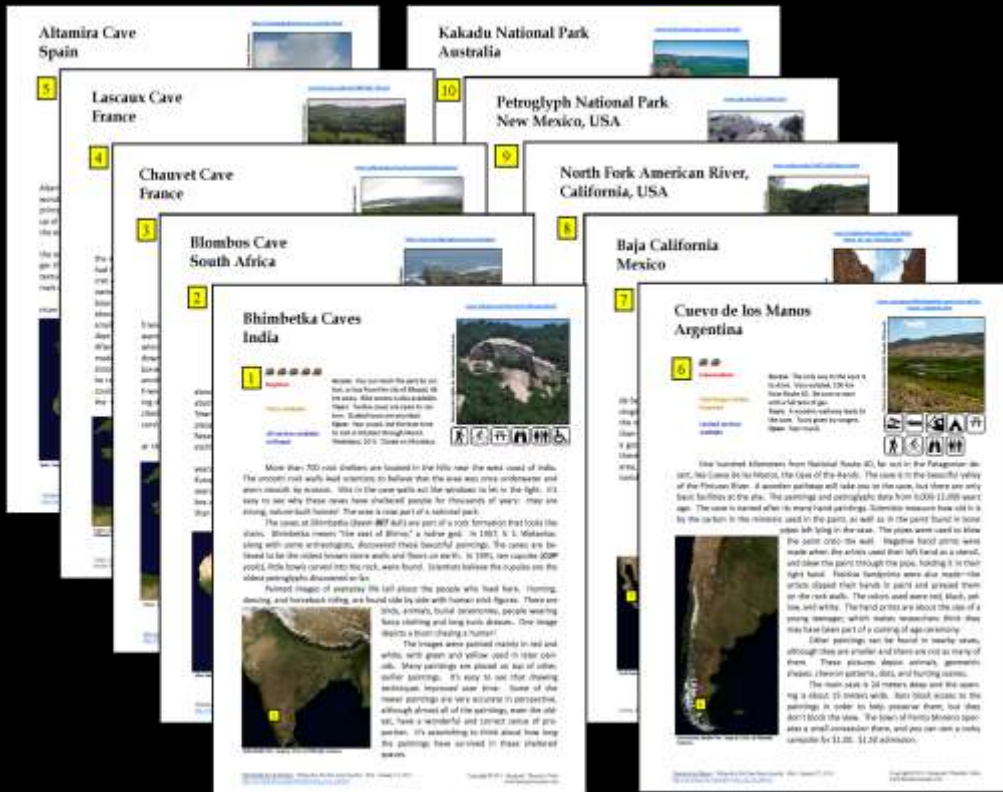


Newspaper Rock, Utah. Photo by Greg Thomas, via
National Geographic. (Source: Our Family Wizard.org)

5. This is a photograph of a rock named "Newspaper Rock." How do you think it got its name? Is it a good name? Why or why not? What does it tell you about the people who lived there?

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Reading Worksheets (4 pages)



"Point of Interest" Cards & Poster

Describe 10 rock art sites in the travel genre for reading instruction and writing models

Lascaux Cave France

4

Access: You cannot visit the caves. A replica has been built for visitors to enjoy.

Tours: Guided tour lasts 40 minutes.

Open: Year round, except January-mid February. Daily hours vary due to time of year.

Entrance fee: 8.50 euros. Expect a long line, especially in summer. A prehistoric theme park is in the area. Visit it first to prepare for the cave painting experience.

www.lascauxcave.com/en/visiting-the-cave

Photo by Eric Frenckin, via Public Domain

One Sunday afternoon in September, 1940, four boys and a dog went for a walk in the woods. They were trying to get away from the tension of their parents as Germany had invaded France and taken over Paris. They were climbing on a hill said to have a secret cave that led to a local castle. On the way home, Robot, the dog, disappeared. His owner, Marciel Ravidat, called out for him and heard him in the middle of a thicket. The boys pushed their way through the brambles and found Robot in the bottom of a hole about five feet deep. Marciel climbed into the hole to get his dog and found another small hole in the bottom. It was late, so they all went home, but Marciel came back four days later to snoop around. Along the way he picked up three friends to go with him. After enlarging the hole, he squeezed down a narrow tunnel. He was carrying a homemade, fire torch, and he slithered along on his belly until he reached a room. When he stood up he slipped on a piece of flint, his torch went out, and he slid down a slope until he reached the bottom. Bruised, but okay, he called for his friends to follow. The boys could barely see what was around them, but they explored the rooms of the cave. As the tunnel narrowed, Jacques happened to look up. Astonished, he cried out and pointed to the ceiling! Paintings of horses and bulls ran together all over the ceiling and the walls of the tunnel. The cave walls were made of white calcite and the brilliantly painted animals looked like they were rushing around in the flickering torch light. The boys danced around in amazement. "We were completely crazy," Jacques said. They vowed to keep the cave a secret, but two days later they brought some visitors, and ten days later 200 people a day were visiting the magical spot. They brought their teacher to see it, and he brought an archaeologist. It was one of the great discoveries of the twentieth century, made by a dog and some children!

France: Image by NASA/United Space Flight Center via Wikimedia Commons

Curtis, Gregory. *The Cave Painters—Following the Footsteps of the World's First Artists*. New York: Anchor Books, 2006.

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Altamira Cave Spain

<http://museodealtamira.mcu.es/index.html>

5



Beginner

Tours Available

All services
available

Access: You can reach the cave by car, bus, or taxi. The cave is in the town of Santillana del Mar.

Tours: There are guided tours of the replica cave as well as the original cave.

Open: May to October, Tue-Sat 9:30-20; November to April, Tue-Sat 9:30-18, Sun, Holidays 9:30-15.



Beautiful colored paintings, 15,000 years old, cover the ceilings of the S-shaped Altamira cave in northern Spain. Bison are the primary subject of this archaeological wonder, but horses, a hind, and two wild boar also cover the walls of the cave. Hand prints, hand outlines, and animal-people can be found here as well. Altamira is made up of a series of rooms, connected by passages. The main hall is about 30 meters from the entrance of the cave.

The artistic style, and the way the paintings have lasted through the years, made the original researchers think the work was a fake. Many of the animals are painted larger than life and details are clearly shown. Fur and manes are painted with a variety of textures created through the use of only three colors—ochre, red, and black. The animals move across the ceilings of the cave as if they are alive.

In 2008, British scientists dated the paintings using a method called U/Th. Uranium changes into thorium over time, and this is what is measured in the U/Th method.




Spain: Image by NASA/Goddard Space Flight Center, via Wikimedia Commons.

The crust (patina) that grows over the painting is tested to see how long it has been there. This method only gives a minimum (the youngest) age of the painting, but these tests indicate the Altamira paintings are between 25,000 and 35,000 years old!

Access to the cave is restricted. Carbon dioxide in the visitors' breath damages the paint. In 2002 a replica of the cave was opened, and now that is the only way most visitors can see these amazing pieces of art. The cave was reopened in 2010 to a very small number of visitors per day.

Internet Research (2 pages)

Name _____ Date _____

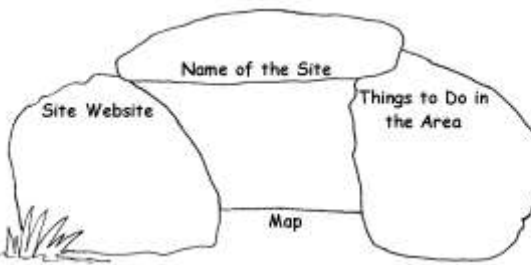


Point of Interest Research

Our class will create a book of rock art **Points of Interest**. Look at page 1 of the [Tour Guide](#). It shows a sample of the page you will be creating for a site you select. You can find more examples on pages 11-13 of that book. The "Point of Interest" cards in the mini museum are another source of information. You will be using the Internet to gather information on an interesting site of rock art. This page will help you collect the information you need. Have fun as you go global to find new and interesting rock art sites around the world!

1. Do a web search to find a site that sounds interesting to you. Write down the name of the site. _____
2. List three reasons why you think we should know about it.

3. Tell me the name of the site as soon as you decide on it. We will only have one page to work on a site. _____
4. Use the organizer to help you take notes on the rest of the information you will need for your Point of Interest article.



Title _____

Address level _____

Access _____

Hours _____

Open _____

Name _____ Date _____

Research References

Use these pages to keep track of all your information sources.

Book Credits

Author's Name _____ Name of the Book _____ City of Publication _____

Publisher _____ Year _____

Website Credits

Author's Name _____ Name of Article _____ Website _____

Name of Website _____ Date you were on the website _____

Author's Name _____ Name of Article _____ Website _____

Name of Website _____ Date you were on the website _____

Public Domain Image Release

Photo, Drawing, Clipart _____ via _____ Website where you got it _____

URL of public domain release: _____

Photo, Drawing, Clipart _____ via _____ Website where you got it _____

URL of public domain release: _____

Rough Draft Outline (1 page)

Writing Worksheets (5 pages)

Name of Site _____

Site URL _____

Address level _____

Access _____

Hours _____

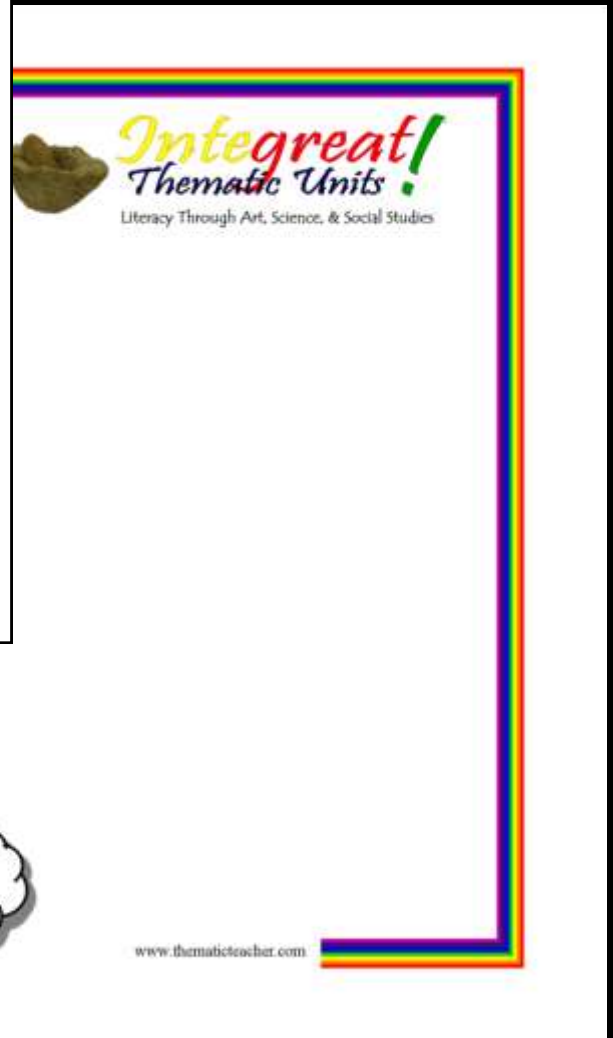
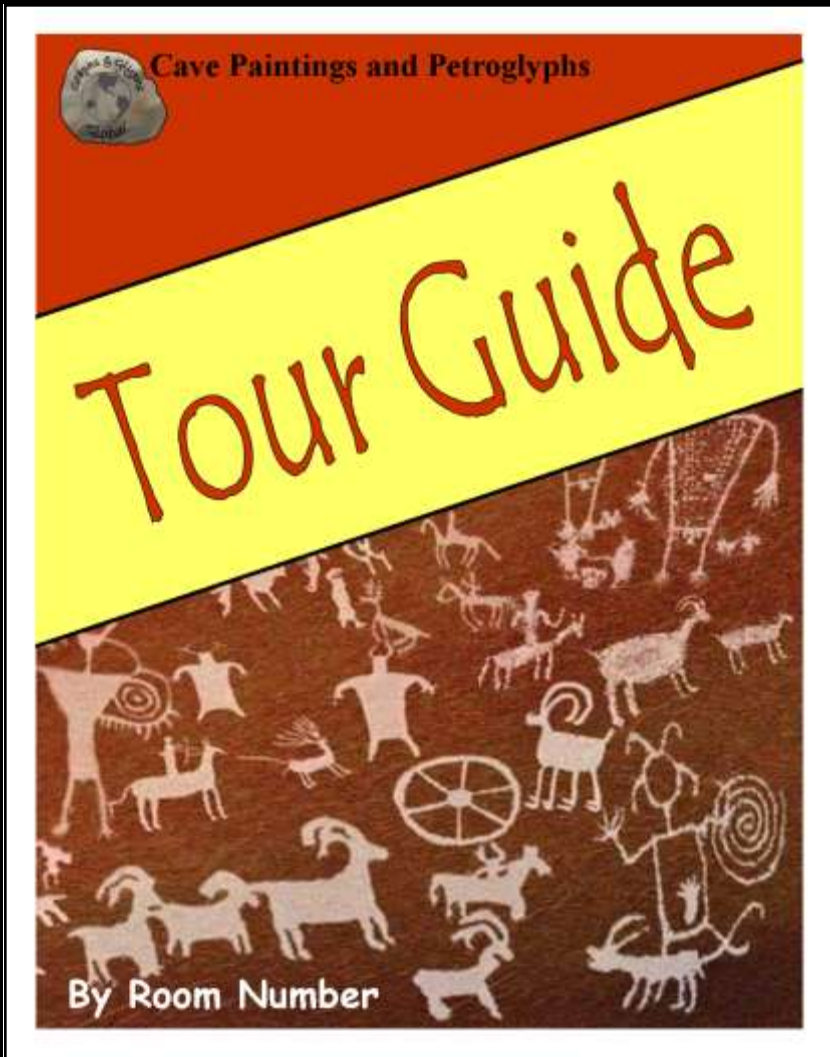
Open _____

Start typing the description of your site here.

When you run out of room above, finish your article here.



Includes Word Processing Template (1 page)
for final copy



Covers for Class made book
Type in your own name

Cave Paintings & Petroglyphs



Classification Game



Art Prints



Timeline Poster

Art Project

<h3>Petroglyph Carving</h3> <p>Use a sharp object to carve a design into the rock surface. This is called a petroglyph. The design is made by removing the surface of the rock.</p> <p>Materials: - Sharp object (like a rock) - Smooth rock (like a stone)</p> 	<ol style="list-style-type: none"> 1. After you have finished carving, use a soft cloth to clean the rock. Use the cloth to remove any dirt or debris. This will help you see the design more clearly. 2. Let the rock dry. <p>The petroglyph will be visible when you look at the rock from a distance. You can also use a magnifying glass to see the details. This is called a petroglyph. The design is made by removing the surface of the rock.</p>
<h3>Petroglyph Painting</h3> <p>Use a brush to paint a design onto the rock surface. This is called a petroglyph. The design is made by painting the rock with a special paint.</p> <p>Materials: - Paint (like a red or blue) - Brush (like a paintbrush) - Smooth rock (like a stone)</p> 	<ol style="list-style-type: none"> 1. Dip the brush in the paint and use it to paint the design onto the rock. Use a steady hand and make sure the paint is applied evenly. 2. Let the paint dry. <p>The petroglyph will be visible when you look at the rock from a distance. You can also use a magnifying glass to see the details. This is called a petroglyph. The design is made by painting the rock with a special paint.</p>
<h3>Petroglyph Rock</h3> <p>Use a rock to create a petroglyph. This is called a petroglyph. The design is made by carving the rock with a sharp object.</p> <p>Materials: - Sharp object (like a rock) - Smooth rock (like a stone)</p> 	<ol style="list-style-type: none"> 1. Use a sharp object to carve a design into the rock surface. This is called a petroglyph. The design is made by removing the surface of the rock. 2. Let the rock dry. <p>The petroglyph will be visible when you look at the rock from a distance. You can also use a magnifying glass to see the details. This is called a petroglyph. The design is made by removing the surface of the rock.</p>



Ancient Rock Art

18 Art Prints



Albino Bison, Spade. Photo by JTC (Own work) (own photo) [Public domain], courtesy of Wikimedia Commons. Unlike the the Bison was painted rather a bison in the rock. This is common in many rock paintings.



Petroglyphs, Pit's Lava, New Mexico. Photo by J. Cruse, courtesy of National Science Foundation (www.eyes.org).




Albino Bison. Photo by Komarov (Own work) [Public domain], courtesy of Wikimedia Commons



Lower Chertsey Cave, France. Photo by JTC (Own work) [Public domain], courtesy of Wikimedia Commons

Names _____ Date _____



Looking at Rock Art Discussion Guide

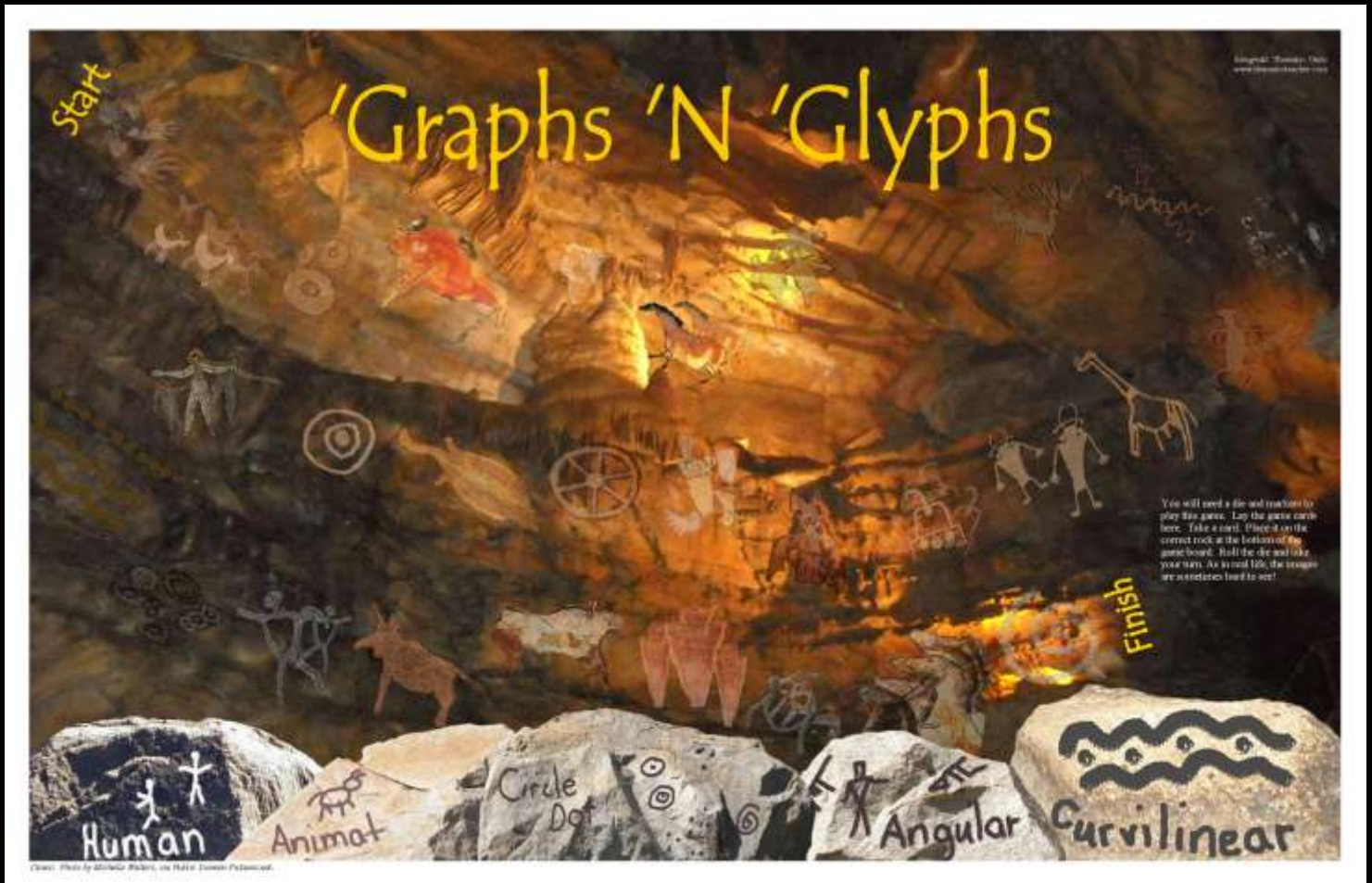
As you examine the Art Prints, discuss these questions with your team. Each person will take notes for one piece of art. You'll need 2 sheets each art print.

Shared notes

- Why would someone make this image?
- How did the artist arrange the figures?
- Where is the art?
- Is this a piece of art? Why or why not?
- How does the color make you feel? Why?
- How does the art work fit in with the background?
- What colors were used? How were they combined?
- What tools were used?

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8.5X11

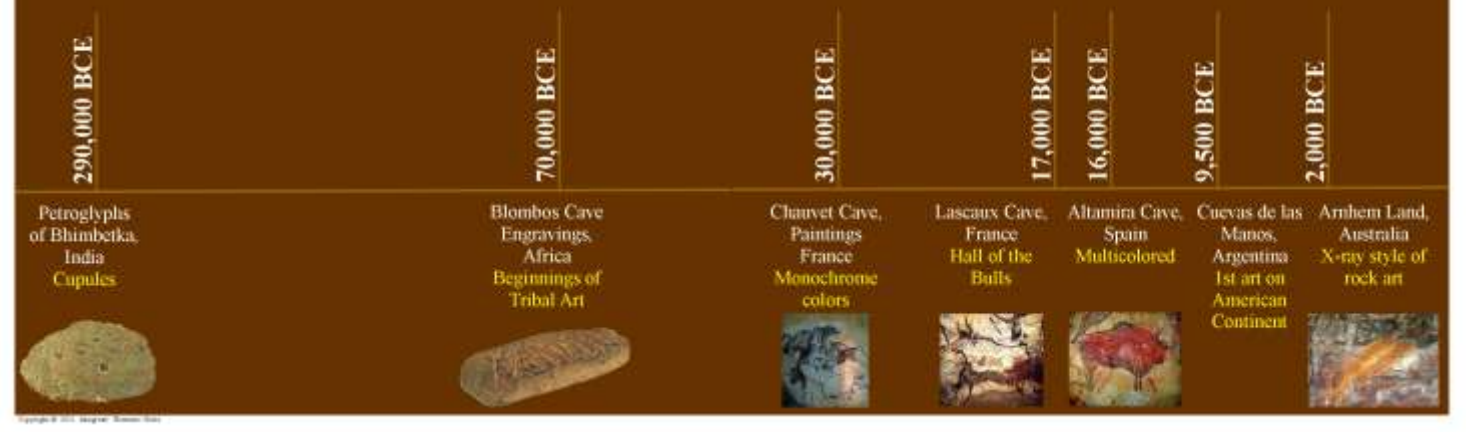


'Graphs 'N' 'Glyphs

Art Classification Game

11X17 Game Board w markers

Timeline of Cave Paintings and Petroglyphs



Timeline Poster 8.5" X 22"

Petroglyph Carving

Native people carved images in rock using sharp stones, sharpened bones, and deer antlers. They used a pecking (chipping) or scratching method. Archaeologists believe they used materials they found in the area, and they just threw these rocks when they were finished. They did not make special tools for this purpose.

Materials:

- pencil and paper
- sharp stone or other carving tool
- cotton swab
- thinned white tempera paint



Directions:



1. Trace your rock on a piece of paper. Draw your design there, first. When it's just the way you want it, then draw it on your rock with a pen or pencil. It should be almost as large as your "rock".



2. Native people used sharp stones to peck their designs into the rock. Try your luck with a sharp stone. If that doesn't work, look around the classroom to see what you can use.



3. Peck or scratch your design into your rock. This may take a while, depending on what you are carving with, and how hard your "rock" is. Add any details you wish.



4. After you have finished carving, use a cotton swab to highlight the lines. Dip the swab in thin white paint and gently paint lightly inside your carved lines.

5. Let the paint dry.

Now you're ready to share your rock with your classmates. Show them your petroglyph and let them tell you what they learn from your reproduction. Tell them what you learned from making it. Then hang it up on the wall for everyone to enjoy!

Petroglyph Painting

As a rock weathers, it develops a crust on the outer side called a "patina." The patina is such matter and often a darker color than the underlying rock. You are going to paint a petro on your glaster rock.

Materials:

- tempera paint: choose a rock color—
 - gray: white, black, brown
 - brown: brown, white, black, yellow
 - black: black, blue, brown
- cardboard covered with foil to make a palette
- small piece of sponge (about 1"x2")
- newspapers



Directions:

1. Cover your work area with newspapers.



4. Dip the sponge in all the colors on your palette and bounce it up and down to begin painting the rock. Don't blend the colors too much.



5. Quickly cover all the sections of your rock that you can see. You might want to paint the back as well. Make sure the edges are covered. Let it dry overnight.



© 2011 Integreat! Thematic Units. All rights reserved. This is the reproduction method for the glaster rock in the book. Photo by Steve Gendron for Integreat! Thematic Units.

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Petroglyph Rock

You are going to make your own "petroglyph" using the information you will learn during the unit. "Petro" means stone, and "glyph" means carving, so a petroglyph is a "stone carving." You are going to make a "rock" that you will later be able to carve.

Materials:

- plaster of Paris
- craft stick
- water
- large sized disposable drinking cup
- tempera paint—brown, white, black, yellow
- sand, in a sand box or plastic box
- jumbo paper clip



Directions:

1. Cover your work area with newspapers. This will make it easy to clean up!

2. Dampen the sand just enough so that it will hold a shape.

3. Dig a rock shaped hole in the sand. Make it about one inch deep and four to five inches wide and long.



4. Fill your cup about half full of plaster. Write your name on one end of your craft stick. Use the other end to mix with.



5. Add water and stir, a little at a time, until the plaster is about as thick as a milkshake. Mix it thoroughly with the craft stick. You'll need to work fast because plaster begins to harden very quickly.



6. Add tempera paint to create the color of a black, gray, or brown rock. Mix it in.



7. Pour the plaster mixture into the hole. Gently tap it down to fill the spaces. Put your stick in the sand next to your rock as your name shows.



8. Bend a large paper clip until it breaks in half. Give it to a friend. Press the paper clip into the plaster and jiggle it a little. This is the hanger. Let it harden.

9. After a couple of hours, gently dig the "rock" out of the sand. Rinse off the loose sand and get it dry. Write your name on the back. It will take several days or a week for it to dry completely. Then it will be very hard, just like the rocks the native people carved!



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Make Your Own Petroglyph
Students read and follow directions to make a
plaster rock and then carve an image on it.



Altamira Bison: Photo by Ramessos (Own work) [Public domain], via Wikimedia Commons.

2 Math Activities

Name _____ Date _____

Meters, Yards, Feet



Most of the world uses the metric system for measurement. The United States is one of the only countries to use the standard system of measure. When you find information about other countries, you will usually find the measurements are given in metric units. It's important for us to be able to understand the relationship of the two different systems. Today you'll learn a little more about comparing meters, yards and feet.

A yard is three feet, or 36 inches.



If you stretch your arm out to your side, the distance from the tip of your fingers to your nose is ABOUT a yard. A yard is just a few inches longer than a meter, so the distance is also ABOUT a meter.

- Measure a friend's arm from the tip of your fingers to your nose. Look straight ahead as they measure.
- Now do the same for your friend.

Estimate

How long is your arm? _____

A meter is 3.37 inches longer than a yard.

36 inches = 1 yard 100 centimeters = 1 meter

10 feet = _____ meters
10 yards = _____ feet and _____ meters.

Meters, Yards, Feet, page 2


Object	Yard	Feet
1. 1 yard	1.00	3.00
2. 2 yards	2.00	6.00
3. 3 yards	3.00	9.00
4. 4 yards	4.00	12.00
5. 5 yards	5.00	15.00
6. 6 yards	6.00	18.00
7. 7 yards	7.00	21.00
8. 8 yards	8.00	24.00
9. 9 yards	9.00	27.00
10. 10 yards	10.00	30.00
11. 11 yards	11.00	33.00
12. 12 yards	12.00	36.00

Copy patterns that you can:

Trace the numbers to the nearest whole numbers. Start next to the original numbers.

Write the following forms:
10 _____ feet
10 _____ meters

On a Grand Scale!




In Palo Alto (BARN here) California there are enormous images of people and animals painted on rock faces, beneath overhanging ledges, and inside of shallow caves. No one knows much about the people who created these pictures, but we know it was not an easy task. Some of the paintings and carvings are 25-30 feet above the ground. How did the artists reach the area? How did they get the paint to the site? Did they mix "brushstrokes" and carry them up on a ladder? Did they have assistants who mixed and carried the paint up to them when they needed it? Why did they paint on exposed rock? How did the paintings last for thousands of years out in the weather? Lots of questions remain about these ancient works of art.

To help you get a better idea of the size of the paintings and how hard the task was, you are going to create a full size drawing of one of the BSA designs. In real life, the great mural paintings range from six feet to thirty feet in size. You are going to work with a partner or group to make a mural sized drawing, if though yours won't be quite as big as the original! Have fun, and think about how much harder the job would be out in the desert, painting on the side of a cliff, thirty feet above the ground!

Materials

- 1/2 inch paper in the correct length for the image you choose
- scissors
- colored image to reproduce
- pen/cil
- eraser
- paper/tissue
- marking pen
- tempera paint and sponge (optional)



On a C

1/2 inch

1/2 inch

1/2 inch

1/2 inch

On a Grand Scale! page 2

8. Now think about doing that out in the desert, on a smooth rock wall, 10-30 feet above the ground! What do you think about that?



Name _____ Date _____

Polish that Patina


You can remove the patina from a dull penny.

Rocks are not the only things that develop a patina. Furniture and many types of metal grow them, as well. Just as in rocks, this patina is formed from a chemical reaction. In furniture, the chemicals of the wood, the polish, the oils in our hands, and the air all work together to create the patina. It makes the wood glow. On metal surfaces, the patina, also called tarnish (think rust), is created by the chemical reaction between the metal and the air. Freshly minted coins are shiny and bright. Old coins have developed a patina that makes them dull and dark. Just as a patina robs people and things of their shine.

You can remove the patina from a metal object, and you can also cause a metal object to develop a patina. Stripping the patina is the result of a chemical reaction, it makes sense that it takes chemicals to remove or create a patina.

Materials

- 1 aluminum foil cup
- 2 dull pennies, about the same dullness
- 1/2 cup vinegar
- 1 teaspoon salt
- paper towels
- water
- spoon or popsicle stick



Directions

Pour the vinegar into the cup. Add the salt. Stir until the salt is dissolved. Dip a penny halfway into the vinegar and hold it there for 15 seconds. "Wipe it out." What do you see?

Dip both pennies in the vinegar. What do you see?

Let the pennies sit in the vinegar for 3 minutes.

Label 2 paper towels. Write "Washed" on one, and "Untreated" on the other.

Take the pennies out of the vinegar. Put one penny on the "Washed" towel. Rinse the other penny off in the sink under running water. Place it on the "Untreated" towel.

Compare with the patina on a rock?


Patina and Rock

Polish that Patina, page 2

2 Science Activities

Name _____ Date _____

Pour in the Pores



Rocks that are exposed to weathering—rain, snow, sleet, hail, wind—develop a surface layer that is different from the rock itself. Water seeps into the rock through the pores, tiny holes in the rock. Some of the minerals in the water. Later, when the water evaporates, the minerals are brought to the surface and are left behind on the rock. These minerals mix with the air around the rock, and form a crusty, dirt layer. This is the patina (pronounced pah-TIN-ah). It is usually softer than the rock, and so it is easier to scratch and carve. When the patina is scratched through, the lighter color of the rock shows up. Much of the carving and sculpting of rock art is done on the patina.

Your skin also has pores—tiny holes that allow water and air to pass through. Look at the skin on the back of your hand with a magnifying glass. You may be able to see your pores, or they may be too small. Draw what you see in the magnifying glass.

If you have a microscope, use it to find your skin pores. Put your hand on the microscope stage and adjust the focus. Draw what you see.

Now go outside for a ten minute run. You need to run the whole time, but you don't have to go fast. When you finish, look again at the skin on your wrist. What do you see? Draw it in the magnifying glass.

What is happening?

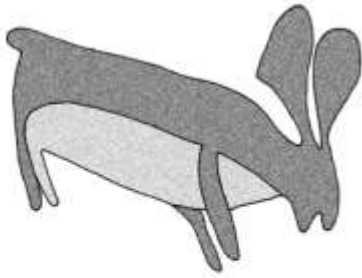
Pour in the Pores, page 2

Repeat the steps as you look through the microscope. What happens? Draw and write.



Interdisciplinary Activities

Sample Page 1



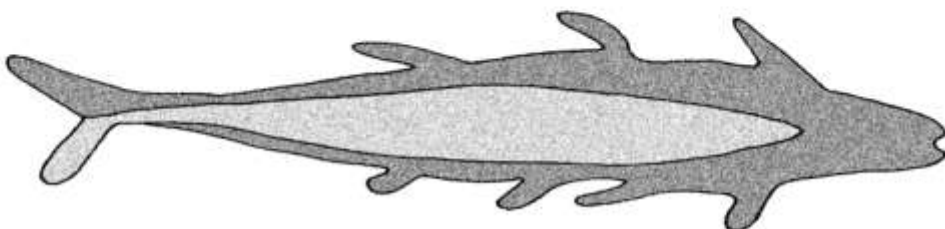
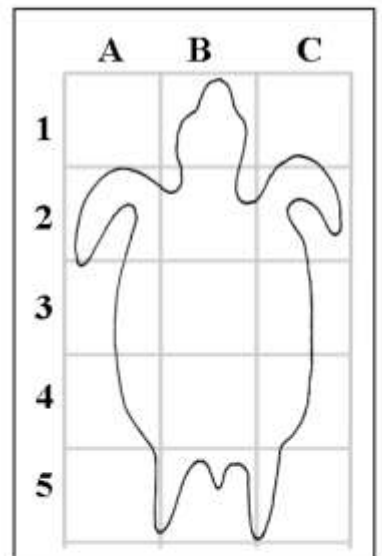
On a Grand Scale!

In Baja (**BAW** haw) California there are enormous images of people and animals painted on rock faces, beneath overhanging ledges, and inside of shallow caves. No one knows much about the people who created these pictures, but we know it was not an easy task. Some of the paintings and carvings are 25-30 feet above the ground. How did the artists reach the area? How did they get the paint to the site? Did they mix “bucketfuls” and carry them up on a ladder? Did they have assistants who mixed and carried the paint up to them when they needed it? Why did they paint on exposed rock? How did the paintings last for thousands of years out in the weather? Lots of questions remain about these ancient works of art.

To help you get a better idea of the size of the paintings and how hard the task was, you are going to create a full size drawing of one of the Baja designs. In real life, the great mural paintings range from six feet to thirty feet in size. You are going to work with a partner or group to make a mural sized drawing, although yours won't be quite as big as the originals! Have fun, and think about how much harder the job would be out in the desert, painting on the side of a cliff, thirty feet above the ground!

Materials

- butcher paper in the correct length for the image you choose
- scaled image to reproduce
- pencil
- eraser
- yardstick
- marking pen
- tempera paint and sponge (optional)



Geography Study Cards

11 cards
show landmasses
and continents for
recognition practice



2, 11X17 Satellite Maps,
for "Point of Interest" locations



Geography Activities

Cave Paintings and Petroglyphs

Geography

Study Cards



NASA Satellite Photo, via Wikimedia Commons



NASA Satellite Photo, via Wikimedia Commons



NASA Satellite Photo, via Wikimedia Commons



NASA Satellite Photo, via Wikimedia Commons

Cave paintings and petroglyphs are found all over the world, so now is a great time to study the shapes and locations of countries and continents. Here are a couple of ways to use these study cards:

- Look at the satellite image, then say the name of the land mass. Turn the card over to see if you are correct.
- Locate the country or continent on the world map.
- Tell whether the image is a country or a continent. (Answers on the back of the world map).

Argentina

Mexico

India