How do we draw conclusions about ancient societies based on their technology?

Retrieved from: https://pixabay.com/en/photos/hieroglyphs/

Supporting Questions

1. What does art and architecture reveal about a society?
2. How do archaeologists interpret ancient cultures based on lasting artifacts?
3. How do art and architecture contribute to what we know about ancient technology?
4. What technology did the people living in Mesopotamia, Egypt, China, India, the Bantu, and Olmec develop?

How do we draw conclusions about ancient societies based on their technology?	
Connection to Connecting Theme/Enduing Understandings	The student will understand that technological innovations have consequences, both intended and unintended, for a society.
GSE for Social Studies	SSWH1 Analyze the origins, structures, and interactions of societies in the ancient world from 3500 BCE/BC to 500 BCE/BC. a. Compare and contrast Mesopotamian and Egyptian societies, include: religion, culture, economics, politics, and technology. b. Describe the societies of India and China, include: religion, culture, economics, politics, and technology. d. Identify the Bantu migration patterns and contribution to settled agriculture. e. Explain the rise of the Olmecs.
Connection to Literacy Standards for Social Studies and Social Studies Matrices	L9-10RHSS1: Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information. L9-10WHST9: Draw evidence from informational texts to support analysis, reflection, and research. Map and Globe Skills: 4. Compare and contrast the categories of natural, cultural, and political features found on maps. 7. Use a map to explain the impact of geography on historical and current events. Information Processing Skills: 1. Compare similarities and differences. 9. Construct charts and tables. 10. Analyze artifacts. 11. Draw conclusions and make generalizations. 15. Determine the adequacy and or relevancy of information.

Supporting Question 1	Supporting Question 2	Supporting Question 3	Supporting Question 4
What does art and architecture reveal about a society?	How do archaeologists interpret ancient cultures based on artifacts (human-made objects)?	How do art and architecture contribute to what we know about ancient technology?	What technology did the societies of Mesopotamia, Egypt, China, India, the Bantu, and Olmec develop?
Sample Instructional Activity	**Sample Instructional Activity**	**Sample Instructional Activity**	**Sample Instructional Activity**
View an image of modern architecture and make predictions about a society.	Archaeological analysis of artifacts	Analyze art and architecture from ancient societies and complete a graphic organizer	Read about the technology of the ancient societies and complete a graphic organizer
Featured Sources	**Featured Sources**	**Featured Sources**	**Featured Sources**
Image of Mercedes-Benz Stadium	**Smithsonian Education, Decoding the Past**	Ancient Art and Architecture Placards	Readings about the known technology of ancient societies.

Summative Performance Task	**PRODUCT PRESENTATION** How do we draw conclusions about ancient societies based on their technology? Conduct a Socratic dialogue addressing the compelling question. For information on conducting a Socratic Seminar, visit: http://www.readwritethink.org/professional-development/strategy-guides/socratic-seminars-30600.html.
	EXTENSION 1. Research the use of satellite technology to discover ancient sites or how radar imaging is exploring lost pyramid chambers. Explain how modern technology helps us understand more about these ancient civilizations. 2. Consider the differences between the ancient cultures with strong governments (Egypt, Mesopotamia, China, India) versus the more stateless societies (Bantu). How would you classify the Olmec? • What different artifacts did they leave behind? What might account for their differences? • How do these differences in the archaeological record cause the stateless societies to be viewed versus the centralized societies?
Taking Informed Action	Research about both environmental and human destruction of ancient sites. Discuss whether or not it is important to preserve the legacy of the ancient world. Here is a list of articles for students to read about threats to historic sites. 1. "These 50 Treasured Places are at Risk of Disappearing," Nick Romeo, *National Geographic*., October 15, 2015. Available at: http://news.nationalgeographic.com/2015/10/151015-threatened-sites-places-cultural-heritage-archaeology/ 2. UNESCO World Heritage Site, World Heritage in Danger. http://whc.unesco.org/en/158/ 3. A Guide to Best Practices for Archaeological Tourism. https://www.archaeological.org/pdfs/AIATourismGuidelines.pdf

The Context

Framing a high-interest historical inquiry that is relevant to students' lives is challenging. In order to justify the instructional time spent taking a deep dive into a specific historical era requires that the lab seeks to explain the, "origin and development or evolution of contemporary matters." (Shim, 2) The need to clearly relate history lessons to student lives is not a new charge, in 1916, the Committee on Social Studies at the National Education Association published a report declaring, "The selection of a topic in history and the amount of attention given to it should depend . . . chiefly upon the degree to the present life interest of the student" (Shim). In an effort to cover a wide curriculum, it is rare for students to learn that history can help solve problems and even assist in avoiding mistakes.

Figure 1: http://www.messagetoeagle.com/archimedes-screw-ancient-invention-used-to-transfer-water-to-higher-levels/

Traditionally the curriculum, instruction, and resources for history focus on the political and economic decision-making of people in the past. There is little focus on one of the most important element of our current and future lives – the study of the history of science and technology. Framing historical inquiries on science and technology will help students understand the following:

- How science and technology shape and are shaped by society
- The problems and opportunities science and technology create
- How citizens can relate most effectively to technological innovation (Shim, 15)

Today, technological innovation seems to move at light-speed and fully defines our society. By investigating the history of science and technology, history teachers will be able to make the study of the past more authentic and applicable to students' lives and futures. For the sake of a common definition of technology, the Oxford Dictionary defines technology as the application of science to practical purposes. In order to investigate ancient science and technology, it is necessary to look at the following elements of those societies. The lessons included in this lab will use archaeological evidence based on art and architecture to identify each of the following in the civilizations listed in SSWH1. By looking at these elements, students will more deeply engage with civilizations that existed 2000 – 4000 years ago. This lens will help make these far-removed civilizations more relevant to students' lives.

- Agriculture
- Art and Architecture
- Machinery and Tools
- Mathematics and Numerical Base
- Measurement and Time
- Metallurgy
- Textiles
- Transportation
- Writing System

References:

Shim, M. (2016, April 23). *Teaching about the history of science and technology in history classrooms: A new direction in STS education.* Retrieved from: http://files.eric.ed.gov/fulltext/

Documents

Document #	Source Information
Document 1	Mesopotamian Lamussa; Bas-relief from the m-wall, k-door, of King Sargon II's palace at Dur Sharrukin in Assyria (now Khorsabad in Iraq). Dated from 713 until 716 BC. Available at: https://commons.wikimedia.org/wiki/File:Human_headed_winged_bull_facing.jpg
Document 2	Uruk in 2008. Photo: SAC Andy Holmes (RAF)/MOD A general view of the Uruk archaeological site at Warka in Iraq. Available at: http://www.defenceimagery.mod.uk
Document 3	Tutankhamen's famous burial mask, on display in the Egyptian Museum in Cairo. Available at: http://bjornfree.com/galleries.html
Document 4	The Great Pyramids of Giza. Available at: https://commons.wikimedia.org/wiki/File:All_Gizah_Pyramids.jpg
Document 5	Painted Jar from the Majiayao Culture from the Late Neolithic Period (3300 - 2200 B.C.). Available at: https://commons.wikimedia.org/wiki/File:CMOC_Treasures_of_Ancient_China_exhibit_-_painted_jar.jpg
Document 6	Picture of the Tomb of Fu Hao available at: https://en.wikipedia.org/wiki/Tomb_of_Fu_Hao
Document 7	Image of excavated ruins of Mohenjo-daro. Available at: https://en.wikipedia.org/wiki/Indus_Valley_Civilisation#/media/File:Mohenjodaro_Sindh.jpeg
Document 8	Picture of Indus Priest/King statue. Available at: https://en.wikipedia.org/wiki/Indus_Valley_Civilisation#/media/File:Mohenjo-daro_Priesterk%C3%B6nig.jpeg
Document 9	Picture ofTerra Cotta Nok Sculpture. Available at: https://commons.wikimedia.org/wiki/File:A_man_ride_a_horse,Nok_terracotta_figurine.jpg
Document 10	Image of Olmec Colossal Head 1. Available at: https://en.wikipedia.org/wiki/Museo_de_Antropolog%C3%ADa_de_Xalapa
Document 11	The great pyramid of the Olmec at La Venta. Available at: https://commons.wikimedia.org/w/index.php?curid=10619724
Documents 12 – 17	Readings about ancient civilizations' technology

Document 1: Mesopotamia

Figure 2: Human-headed winged bull or Lamassu (protective deity) facing. Bas-relief from the m-wall, k-door, of King Sargon II's palace at Dur Sharrukin in Assyria (now Khorsabad in Iraq). Dated from 713 until 716 BC. This sculpture is 4 meters high, 4 meters wide, and 1 meter deep. It is carved from a single block of stone. Louvre Museum, This work is part of the collections of the Louvre (Department of Near Eastern Antiquities). Retrieved from:
https://commons.wikimedia.org/wiki/File:Human_headed_winged_bull_facing.jpg
A lamussa was a protective sculpture that was used both to support buildings and to act as guardians. It has the face of a human, the body of a bull, and the wings of an eagle.

- Describe this figure including apparent materials used in the sculpture.
- What technology would the artist creating this sculpture have needed to create this art work?
- What can you deduce about this society from this statue?

Document 2: Mesopotamia

Figure 2: Uruk in 2008. Photo: SAC Andy Holmes (RAF)/MOD A general view of the Uruk archaeological site at Warka in Iraq. The site of Uruk was discovered in 1849 by William Kennett Loftus who led the first excavations from 1850 to 1854. The Arabic name of Babylonia, al-ʿIrāq, is thought to be derived from the name Uruk, via Aramaic (Erech) and possibly Middle Persian (Erāq) transmission. Organization: Army Object Name: CCT-08-099-OUT-UNC-371 Category: MOD Supplemental Categories: Equipment, Locations Keywords: Iraq, Archeological sites, British Museum, British Army, Uruk Country: Iraq. **Permission details:** Images are downloadable at high resolution, made available at http://www.defenceimagery.mod.uk for reuse under the OGL (Open Government License).

This image shows the archaeological site of Uruk which was a city established in Mesopotamia at the time of the Epic Poem, the Gilgamesh. Uruk continued to be a preeminent city of the region into for 2 millennia.

- Describe the features of this archaeological dig.
- What technology would the builders of this town need to build the walls?
- What can you deduce about this society from this image?

Document 3: Egypt

Figure 3: Tutankhamen's famous burial mask, on display in the Egyptian Museum in Cairo. Bjørn Christian Tørrissen - Own work by uploader, http://bjornfree.com/galleries.html. The burial mask of King Tutankhamen is one of the most renowned artifacts of the ancient world, although it was not found until 1923. Read about Howard Carter's experience exploring the tomb of King Tutankhamen.

- Describe this figure including apparent materials used in the mask.
- What technology would the artists creating this mask have needed to create this mask?
- What can you deduce about this society from this mask?

Document 4: Egypt

Figure 4: A view of the pyramids at Giza from the plateau to the south of the complex. From left to right, the three largest are: the Pyramid of Menkaure, the Pyramid of Khafre and the Great Pyramid of Khufu. The three smaller pyramids in the foreground are subsidiary structures associated with Menkaure's pyramid.
https://commons.wikimedia.org/wiki/File:All_Gizah_Pyramids.jpg

- Describe the buildings including apparent materials used construction.
- What technology would the builders have needed to build these pyramids?
- What can you deduce about Egypt's society from the pyramids?

Document 5: China

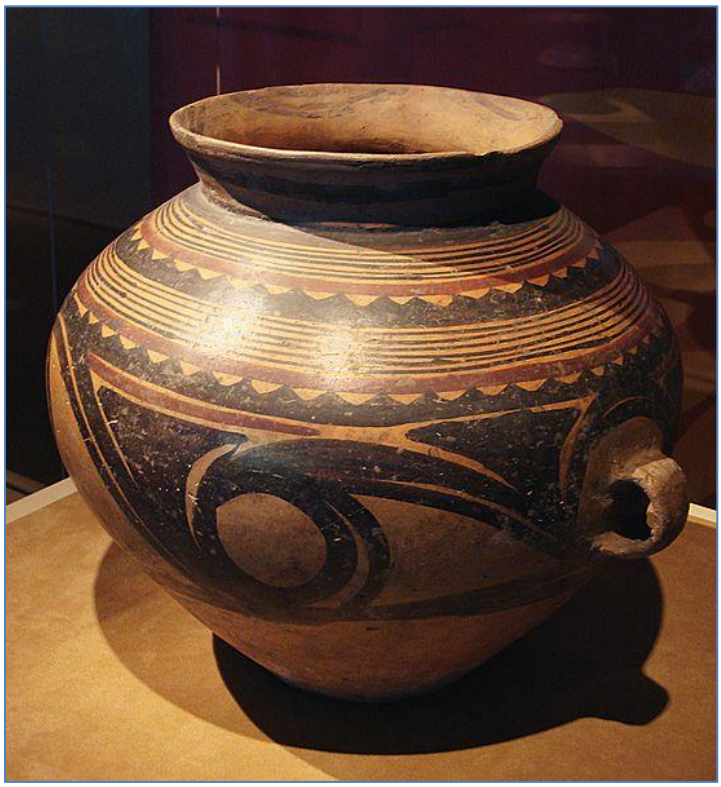


Figure 5: Painted Jar from the Majiayao Culture from the Late Neolithic Period (3300 - 2200 B.C.)
Created by peoples of the Majiayao Culture, who were located along the upper reaches of the Yellow River, this jar would have stored food or water. The body is painted in typical Majiayao pottery colours of orange, yellow, and black, and features whirlpool designs that suggest the Neolithic Chinese used water patterns as a form of decoration.
retrieved from
https://commons.wikimedia.org/wiki/File:CMOC_Treasures_of_Ancient_China_exhibit_-_painted_jar.jpg

- Describe this object including apparent materials used in the jar.
- What technology would the artists creating this object have needed to create it?
- What can you deduce about this society from this jar?

Document 6: China

Figure 6: The Tomb of Fu Hao (simplified Chinese: 妇好墓; traditional Chinese: 婦好墓 ; pinyin: *Fù Hǎo Mù*) is an archaeological site at Yinxu, the ruins of the ancient Shang dynasty capital Yin, within the modern city of Anyangin Henan Province, China. Discovered in 1976, it was identified as the final resting place of the queen and military general Fu Hao, who died about 1200 BCE and was likely the Lady Hao inscribed on oracle bones by king Wu Ding and one of his many wives. It is to date the only Shang royal tomb found intact with its contents and excavated by archaeologists. The excavation was conducted by the Anyang Working Team of the Archaeological Institute of the Chinese Academy of Social Sciences, and after extensive restoration the tomb was opened to the public in 1999.
Retrieved from: https://en.wikipedia.org/wiki/Tomb_of_Fu_Hao.

- Describe this site including apparent materials used in the different objects.
- What technology would the artisans creating these objects have needed to create them?
- What can you deduce about this society from this tomb?

Document 7: India

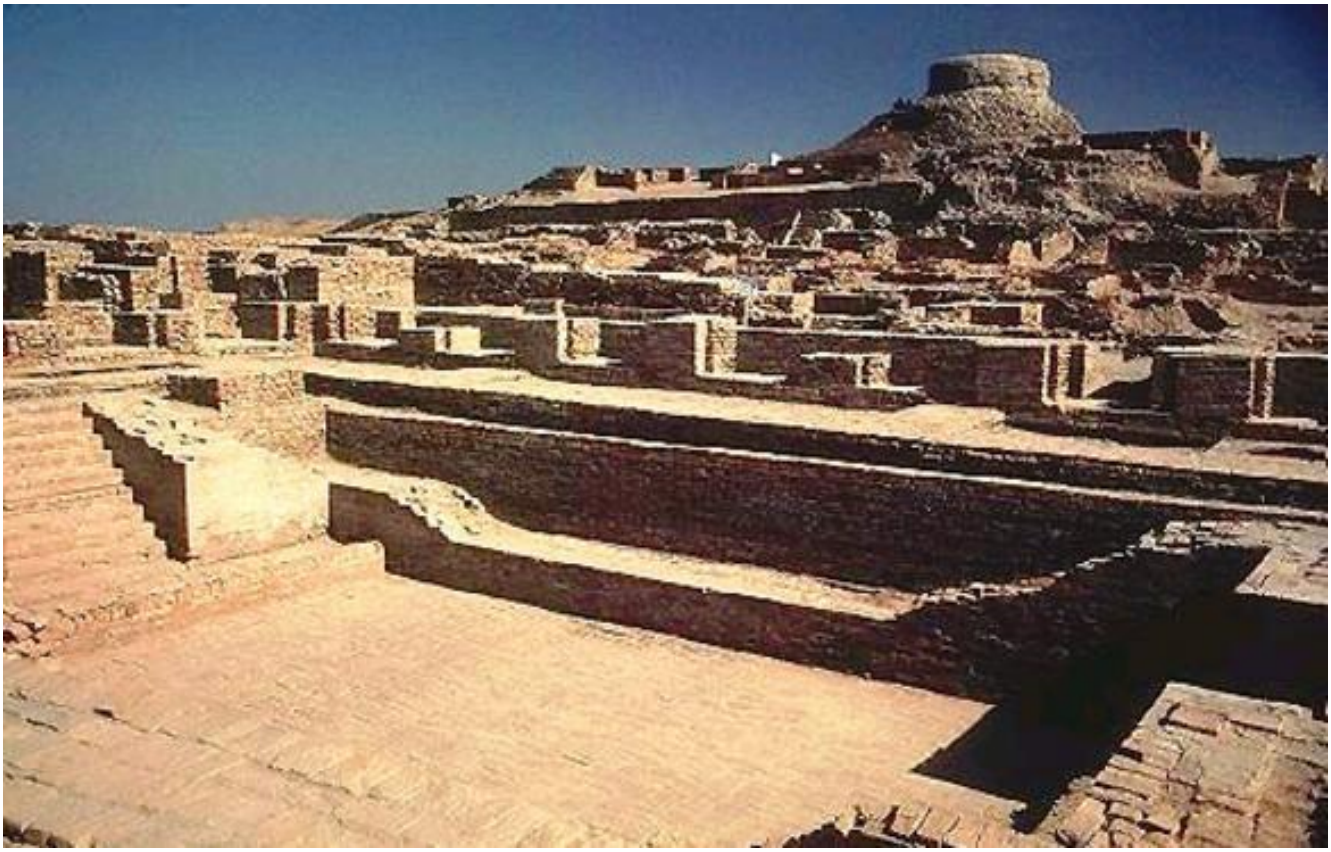


Figure 7: Excavated ruins of Mohenjo-daro, Sindh province, Pakistan, showing the Great Bath in the foreground. Mohenjo-daro, on the right bank of the Indus River, is a UNESCO World Heritage Site, the first site in South Asia to so declared. Retrieved from: https://en.wikipedia.org/wiki/Indus_Valley_Civilisation#/media/File:Mohenjodaro_Sindh.jpeg

- Describe this site including apparent materials used in the different objects.
- What technology would the artisans creating these objects have needed to create them?
- What can you deduce about this society from this site?

Document 8: India

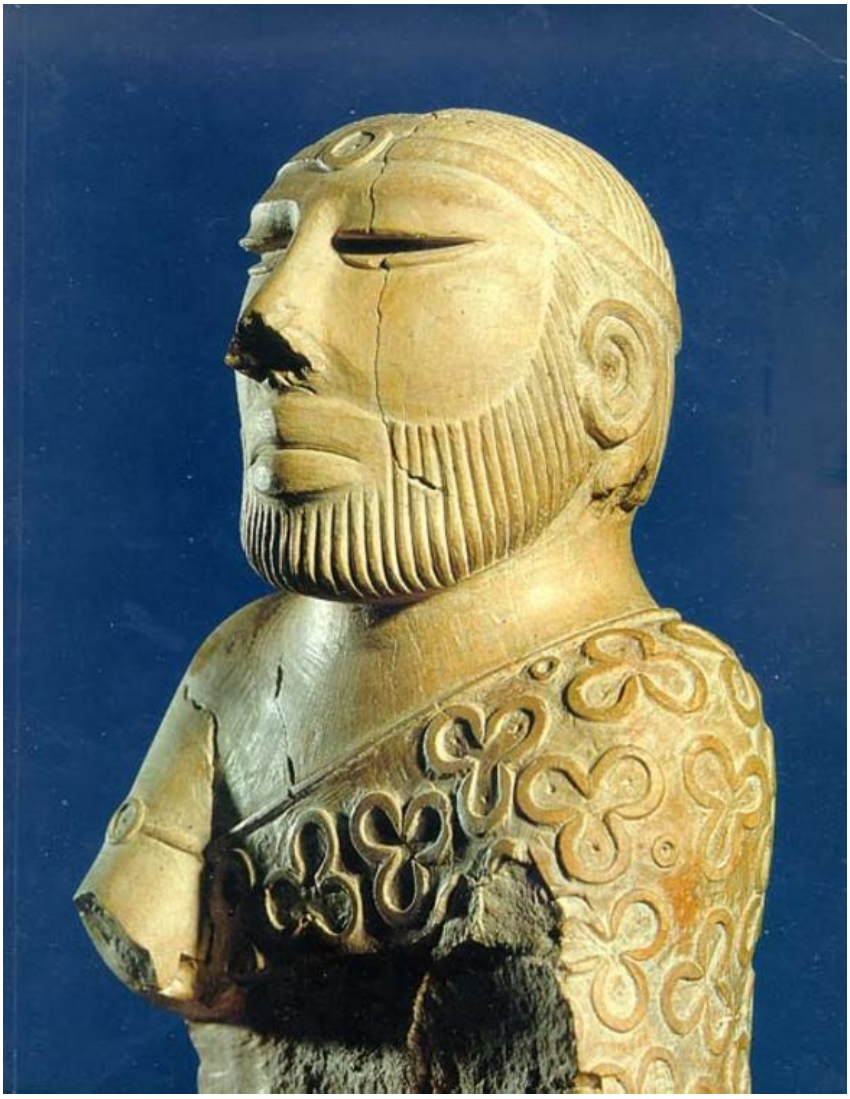


Figure 8: Indus Priest/King Statue. The statue is 17.5 cm high and carved from steatite a.k.a. soapstone. It was found in Mohenjo-daro in 1927. It is on display in the National Museum, Karachi, Pakistan. Retrieved from: https://en.wikipedia.org/wiki/Indus_Valley_Civilisation#/media/File:Mohenjo-daro_Priesterk%C3%B6nig.jpeg.

- Describe this figure including apparent materials used in the statue.
- What technology would the artists creating this statue have needed to create it?
- What can you deduce about this society from this statue?

Document 9: Bantu

Figure 9: A Man Rides a Horse, Terra Cotta, Nok Culture, Aged 1.400 – 2,000 years old, Retrieved from: https://commons.wikimedia.org/wiki/File:A_man_ride_a_horse,Nok_terracotta_figurine.jpg. This sculpture was excavated from Taruga in central Nigeria. It dates from between 500 BC/BCE to 200 AD/CE. The Taruga region is north of the dense forests of Nigeria.

- Describe this figure including apparent materials used in the statue.
- What technology would the artists creating this statue have needed to create it?
- What can you deduce about this society from this statue?

Document 10: Olmec

Figure 10: Front and side views of Colossal Head 1 now located at Museo de Antropología de Xalapa in Xalapa, Veracruz. This head dates from 1200 to 900 BC and is 2.9 metres (9 ft 6 in) high and 2.1 metres (6 ft 11 in) wide. The colossal heads weigh several tons. The consensus of archaeologists is that the heads, made of basalt, represent Olmec kings. Retrieved from: CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=241426.

- Describe this figure including apparent materials used in the statue.
- What technology would the artists creating this statue have needed to create it?
- What can you deduce about this society from this statue?

Document 11: Olmec

Figure 11: The great pyramid of the Olmec at La Venta. The pyramid is constructed predominately of clay. It has not been excavated. By Alfonsobouchot - Own work, Public Domain, https://commons.wikimedia.org/w/index.php?curid=10619724

- Describe the building including apparent materials used construction.
- What technology would the builders have needed to build this pyramid?
- What can you deduce about Olmec society from the pyramids?

Document 12
Egypt: Unity, Security, Stability

Figure 3: http://www.oocities.org/isis_artemis_0/EgyptMap.htm

Geography

The geography of Egypt largely influenced the development of the Egyptian society. Egyptian society centered along the Nile River Delta and is considered to have been an *Oasis in the Desert* surrounded by desert on 3 sides and the Mediterranean Sea to the north, Egyptian culture flourished for almost 3000 years.

Agriculture

The Nile had predictable flood cycles. Egyptian society united around control of the Nile – both flood control and irrigation of crops. Large public projects, including building and maintaining irrigation canals, united society and gave rise to a long, stable government largely ruled by the Pharaohs. Ancient Egyptians grew a variety of crops including grains such as wheat and barley, fruit and vegetables. One of the most valuable crops the Egyptians grew was flax, which was used to make linen. Egyptian farmers raised chickens, sheep, goats, cows, and pigs. They domesticated bees and used honey to sweeten their food. An invading power, known as the Hyksos, introduced horses. Egyptians also domesticated pets – dogs, cats, and monkeys.

Art and Architecture

Ancient Egypt is rich with art and architecture. The most famous of which are the pyramids and obelisks. The ancient Egyptians created paintings, sculptures, carving, columns, and jewelry.

Machinery and Tools

Artisans used many tools including carving tools, the bow-drill, the plumb-line, and simple machines. There is still a great deal of speculation as to what technology was used to build the pyramids.

Mathematics and Numerical Base

As early as 2700 BCE, the Egyptians introduced a base 10 numerical system. There was no system of place value, so written numbers could be difficult to write. Ancient texts illustrate the knowledge of arithmetic, geometry, and algebra.

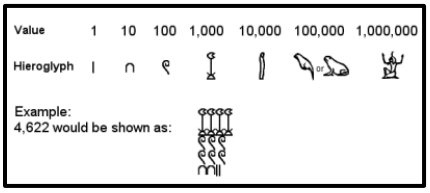


Figure 2: http://www.storyofmathematics.com/images2/egyptian_numerals.gif

Measurement and Time

In order to build large projects including the pyramids and to organize trade, a standard system of weights and measures was necessary. The Book of the Dead, as well as other texts, illustrates the Egyptians weighing objects. The standard unit of measurement was the royal cubit, approximately 52.4 cm. Most measurements were based on body parts. They used a standard wooden rod to measure distances. Later in Egyptian society, the measurements were influenced by other societies including the Persians.

Figure 3: The Egyptian Calendar,

https://tsuplus.files.wordpress.com/2012/12/egyptian-calendar-4000bc-2.jpeg

The Egyptian calendar had 365 days organized into 12 30-day months. There were five extra days at the end of the year. Each month was divided into 3 weeks of ten days. The months were grouped into three seasons

(flooding, planting, harvesting) based on the rising and falling waters of the Nile.

In construction, Egyptian builders used the plumb-line, standards rules of measurement, built with right angles, and the mason's square.

Metallurgy
Egyptians mined copper and traded for gold and silver – or mined it from conquered lands. The first alloy, bronze, was used for weapons, tools, vessels, and jewelry. Lack of significant wood resources to fire forges, the Ancient Egyptians did not produce iron in any great quantity.

Transportation
Egyptians were master boat and ship builders due to their reliance on the Nile. Many boats were constructed from the reeds found along the Nile. They produced the wheeled-chariot and wagons following their introduction by the invading Hyksos.

Textiles and Writing Systems
Egyptian farmers grew flax, which was made into linen. Papyrus reeds grew plentifully along the Nile. The reeds were worked into Papyrus sheets used for writing. The Egyptian writing system was hieroglyphics. Almost every word was represented by an image. The written language had signs that represented sounds, as well.

Sources:
http://www.learner.org/vod/vod_window.html?pid=820

http://cnx.org/contents/kM6IOpr_@2/The-Near-East-3000-to-1500-BC

https://www.khanacademy.org/partner-content/crash-course1/crash-course-world-history/what-happens-when-you-stay-put/v/crash-course-world-history-04

http://www.oocities.org/isis_artemis_0/EgyptMap.htm

http://www.storyofmathematics.com/story.html

Document 13
Mesopotamia: Ruthless Pragmatism

Geography
The societies of Mesopotamia, the land between the rivers (Tigris and Euphrates), were deeply influenced by the unpredictable flooding cycles of the rivers as well as by the easy navigation of the rivers. Mesopotamian societies are characterized more by their warfare and trade than other societies. Unlike Egypt, where the pharaohs were believed to be divine, much of the early authority in Mesopotamia centered in the priests. Since the gods of Mesopotamia were often as unpredictable as the flooding cycles of the rivers, priests, who were seen as intercessors for the people, held great power. Over time, power began to transfer to strong warrior-kings who could lead their people to conquer nearby kingdoms. Warfare fueled technological innovation at the same time it lead to political and economic advances including the use of coins as a means of exchange and the rise of a middle class.

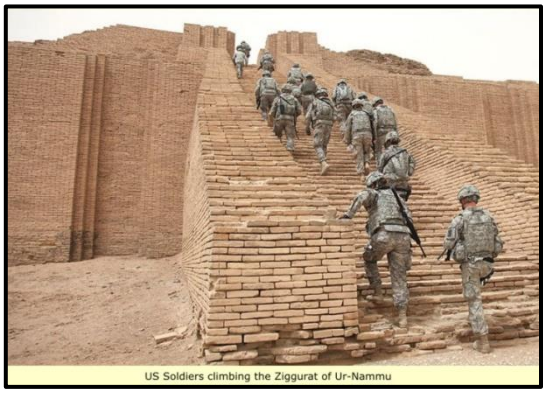


Figure 4
http://realhistoryww.com/world_history/ancient/Misc/Sumer/ziggurat/Ur_nammu_ziggurat_2.jp

Agriculture
While the flooding of the Tigris and Euphrates was unpredictable, the land produced agricultural surplus. Farmers stored grains in central buildings. The grains were then paid to skilled artisans who produced other goods including pottery and metal. The main grain crops were barley and wheat. Mesopotamian farmers also produced fruits like dates, grapes, melons, and figs, as well as a wide variety of vegetables. Farmers raised sheep, goats, and cows. The ancient farmers worked together to control drainage and irrigation.

Art and Architecture
The most important buildings of Mesopotamia were Ziggurats, which were temples that only priests were allowed to enter. The people believed that gods dwelled in the temples. Ziggurats were public building projects and the chief architects were the priests. Priests either laid out the floor plan with string or drew plans on clay tablets. The Mesopotamians used a pottery wheel to create vessels, the carved statues, and they used glass-making techniques.

Machinery and Tools
Farmers used basic farming tools such as the plow and sickle. Many of the innovations of the Mesopotamians were initially designed and driven by war. These include a chariot with wheels – later adapted with spokes and axels to make them lighter. They invented a socketed axe that was stronger than a lashed axe. They used bow and arrow and a mounted cavalry for war.

Mathematics and Numerical Base
Sumerian and Babylonia math was based on 60. While that might seem difficult, they could count using the 12 knuckles of one hand and the five fingers of the other. Babylonians used a place-value system similar to the modern decimal system. Due to the transfer of wealth from consumable goods like crops, cattle, or slaves, Mesopotamians were able to calculate complex ideas like compounding interest. They also closely approximated to value of pi. Based on the need to measure land, they calculated quadratic equations.

Measurement and Time
In order to build large projects including the ziggurats and to organize trade, a standard system of weights and measures was necessary. The standard unit of measurement was the royal cubit, approximately 52.4 cm.

Most measurements were based on body parts. They used a standard wooden rod to measure distances. Later in Egyptian society, the measurements were influenced by other societies including the Persians.
The Mesopotamian solar year was divided into two seasons – summer and winter. The months were lunar and began on the first day of a new moon. By 2400 BCE, the Sumerians calculated 12 months of 30 days for a year of 360 days.

Figure 5: Babylonian Clay tablets from c. 2100 BCE showing a problem concerning the area of an irregular shape
http://www.storyofmathematics.com/sumerian.html

Metallurgy
Metallurgy was a major accomplishment of Mesopotamian empires. In the fourth millennium, they mined copper and were able to build furnaces to create bronze. By the second millennium, metallurgists forged iron. This advance in metal working made the Mesopotamian armies stronger and better armed than the societies they fought. They also used metal for coins. Over time, due to the ongoing warfare, wealth and wages were paid with metal. Metal was easier to transport and store than grains, cattle, or other measures of wealth.

Transportation
Due to the rivers, Mesopotamians became expert shipbuilders and traders. They also applied the pottery wheel to transportation including carts and chariots. Adaptations to the wheel included spokes to make wheels lighter and axels.

Textiles and Writing Systems
Most cloth was woven or felted cloth either from wool or goats hair. Through trade, Mesopotamian societies also had access to linen and silk. The writing system, cuneiform, was written into clay tablets. Early writing included symbols to keep accounts. Later influences from Aramaic cultures brought about a symbolic alphabet with letters more similar to modern written languages.

Sources:
http://www.learner.org/vod/vod_window.html?pid=821
http://www.learner.org/vod/vod_window.html?pid=822
And read: "Iraq and Syria," in *The Near East: 3000-1500 B.C.,*
http://cnx.org/contents/kM6IOpr_@2/The-Near-East-3000-to-1500-BC
https://www.khanacademy.org/partner-content/crash-course1/crash-course-world-history/what-happens-when-you-stay-put/v/crash-course-world-history-03
http://www.storyofmathematics.com/sumerian.html
http://history-world.org/mesopotamiancalander.htm

Document 14
India: Mysterious Urban Planning and the Vedic Age

Geography
The civilization of the Indus Valley, Harappa and Mohenjo-Daro, were situated along the Indus and Suharto rivers. These rivers flooded very regularly and predictably. While these civilizations were quite advanced, little is known about them because there is no way to decipher their writing system. What is known about them comes from the archaeological evidence both in the Indus Valley and Mesopotamia. These civilizations were thought to be very peaceful because there is little evidence of weapons or warfare. The civilization vanished around 1750 BC/BCE. The three theories of why they vanished include: conquest, environmental disaster, or earthquake. The Vedic age began with Aryan migration out of Central Asia into Northern India. The Vedic Age is the basis of much of Hinduism and lasted until the time of Buddha. The Indo-Aryan migrants were largely tribal, but became more urban around 800 BC/BCE.

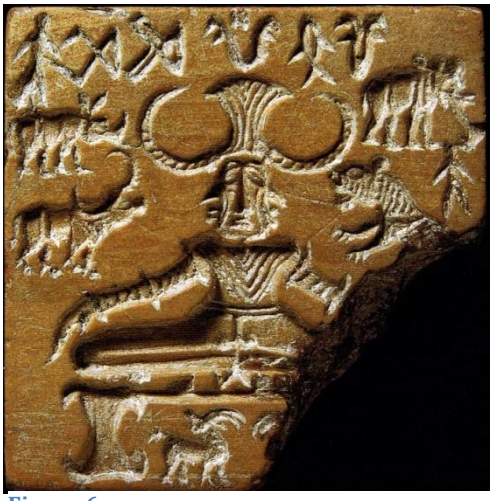


Figure 6
http://www.ancient.eu/uploads/images/361.jpg?v=1431034307

Agriculture
Staple crops included barley, wheat, millet, as well as fruits like melons and vegetables. Flax was grown to produce linen. Cattle, water buffalo, sheep and goats were raised.

Art and Architecture
Harrapa and Mohenjo-Daro feature well-planned cities with densely constructed buildings made with perfectly shaped bricks. The cities have perpendicular streets, which are oriented to catch the wind to maximize air circulation. Each building has drainage to common sewers as well as plumbing. A feature of the city is a large, public bath. This civilization created bronze medallions to mark their trade goods into Mesopotamia.

Machinery and Tools
Tools were constructed from bronze and iron. Since these metals are not from the area, it is believed that they traded for them with Mesopotamia.

Mathematics and Numerical Base
There is evidence of the use of geometric principles, the use of a decimal system and place value; however, not much additional information is available since the writing is indecipherable.
In Vedic scripture, texts refer to exponential numbers from 100 to 1 trillion.

Measurement and Time
There is evidence of standard weights and measures.

Metallurgy
They traded with Mesopotamia for metals and were skilled with making tools, coins, and art with both bronze and iron.

Textiles and Writing
This civilization made cotton cloth that was traded with Mesopotamia. They had a system of writing that is not able to be deciphered.

Sources:
https://www.khanacademy.org/partner-content/crash-course1/crash-course-world-history/what-happens-when-you-stay-put/v/crash-course-world-history-02

https://www.youtube.com/watch?v=p5bqAKixgYA

https://www.youtube.com/watch?v=zulZTaK9u3M

Document 15
China: Dynasties of Power

Geography
The key to Chinese geography is that it was isolated by many geological barriers (mountains, deserts, and rivers) from the other ancient civilizations. The Chinese civilization first emerged as early as 2000 BC/BCE with the Xia Dynasty between the Yangtze and Huanghe (Yellow) Rivers. These rivers flow from the highlands into the ocean. The majority of fertile land in China is between these two rivers. The first emperor, Yu, was a mathematician and engineer. He figured out how to control the floods of the rivers. This helped support agriculture.

Agriculture
The Chinese built canals to control flood waters from the rivers and water crops including tea, poultry, rice, fruits, and vegetables.

Art and Architecture
The upper classes lived in timber-framed houses within cities that were surrounded by thick walls that required organized government to force workers to build. Farmers and artisans lived outside of the walled citizens.
The Chinese were master jewelry designers, carved jade, and made weapons.

Figure 7: Oracle bone retrieved from: https://www.ancient.eu/image/4562/

Mathematics
The Chinese used base 10 math. The extensive trade required efficient numbers and accounting systems. They used units and place value system to effectively write numbers. The Chinese are believed to have invented the abacus to keep track of numbers.

Measurement and Time
The Chinese calendar was both lunar and solar. The new moon is a black moon. A month is determined by the moon cycle. Ordinary years have 12 months, but leap years have 13 months determined by the moon cycles. The Chinese years are not in sequence, but rather in 60 year cycles. Each year in a cycle has a name.

Chinese measurement was standardized. Measurement increased by multiplying by 10. This is similar to the decimal system, although the actual measurements were based on Chinese measurements. For centuries, a bolt of silk was the currency. A bolt measured between 15 and 25 yards.

Metallurgy
The Chinese cast bronze, iron, and smelted steel. They were able to create wrought iron as well as cast iron.

Transportation
The Chinese built roads, made ships, had mounted armies. They also used chariots and carts.

Textiles and Writing
The first writing system came from writing on oracle bones with symbols dating from the Shang dynasty. The early writing focused on ideas rather than sounds. Each character stands for an idea instead of a word or sound. There is not necessarily a correlation between the spoken and written languages. To read Chinese, a person would have to read over 1000 symbols.

The Chinese made silk from the cocoons of silk worms as well as linen, fine leather, and other textiles.

Sources:

https://www.youtube.com/watch?v=CvFuxeoSX1s
"China and Manchuria," in *The Far East: 3000 to 1500 B.C.*, http://cnx.org/contents/mhTvwbhf@2/The-Far-East-3000-to-1500-BC
http://www.storyofmathematics.com/chinese.html
http://www.chinasage.info/measures.htm

Document 16
Olmec: Giant Heads and Pyramids in the Americas

Geography
The Olmec civilization was in modern-day Mexico near the Yucatan Peninsula. The major sites were San Lorenzo, Tres Zapotes, and La Venta. The civilization flourished from 1200 to 400 BC/BCE. The name Olmec comes from the name the Aztec called them. Archaeologists from the Smithsonian first discovered the Olmec sites between 1939 and 1946. Even though there are amazing monuments including pyramids and large stone heads (measuring up to 8 feet in diameter), little is known about the Olmec. Experts believe the Aztec and Maya civilizations both have influences from the Olmec. The major cities suffered intensive damage and destruction that might have been caused by a revolt, although that is also not known.

Agriculture
The principal crops of the Olmec were maize, squash, avocado, and beans. Due to the climate and fertile soil, they probably harvested the crops twice a year. They tapped rubber trees to make rubber and probably harvested cacao beans.

Art and Architecture
The most memorable art of the Olmec is the giant heads, believed to be kings, carved from basalt. They also carved in jade and obsidian as well as carved and painted on cave walls. Many of the images have jaguar or bird images in them. The Olmec often buried the sculptures. The cities of the Olmec were planned and designed to be symmetrical with streets along a north/south axis. The cities included ball courts, temples, and residences. The Olmec also built step pyramids.

Mathematics
Little is known about Olmec mathematical systems, however, the Maya used bae 20 mathematics. Experts believe that the Maya took their mathematics from the Olmec. Based on some deciphering of Olmec writing, experts believe that the Olmec used a concept of 0, which is considered to be very advanced mathematically.

Measurement and Time
Scholars have determined that the Olmec used a two calendar system; the sacred calendar with 260 days and a lunar calendar with 365 days. They tracked planets and predicted eclipses. It is believed that their calendar system was also used by the Maya, Aztec, and other Meso-American civilizations.

Metallurgy
There is no archaeological evidence of metallurgy, so the carvings and construction of stones would have been very time consuming.

Textiles and Writing
The Olmec left a written record of glyphs carved on stone; however, it has not been fully deciphered. This means that not everything is known about the civilization.

Sources:
http://www.ancient.eu/Olmec_Civilization/
http://anthropology.si.edu/olmec/english/
http://ic.galegroup.com/ic/suic/ReferenceDetailsPage/ReferenceDetailsWindow?zid=56713cc7a1556331191e162670d7da69&action=2&catId=&documentId=GALE%7CCX3424400034&userGroupName=clea26856&jsid=e46f8ef1b6d42c0a588f8127cdbc3f85
http://earlyamericanhistorymuseum.weebly.com/olmec-arts.html

Image credits:
Map: http://www.ancient.eu/Olmec_Civilization/
Olmec Baby: by Mary Harrsch (Photographed at the Metropolitan Museum of Art, N.Y.), published on 15 October 2012, http://www.ancient.eu/image/921/

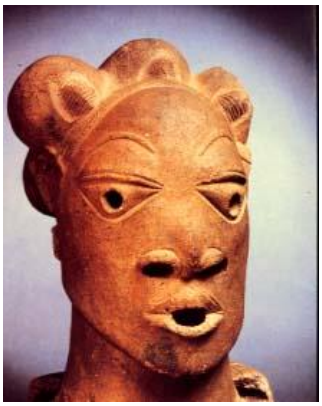
Document 17
Bantu: Influential Migration

Geography

The Bantu people migrated from western sub-Saharan Africa to the South and West. They spread agriculture, knowledge of iron working, and sculpture wherever they settled. Sub-Saharan Africa is dominated by grasslands known as savanna. The savannas are interspersed among the mountains of East Africa, the rainforests, and Kalahari Desert. The Bantu people originated in the area near the upper Niger River.

Agriculture

In western Africa there was plenty of land and water to grow crops. The Bantu grew crops such as bananas, millet, sorghum, rice, and yams. They raised flocks of grazing animals such as cattle, goats, and sheep. Adventurers and explorers moved south and west taking the farming tradition with them. The migrations began around 1500 BC/BCE.



Art and Architecture

The Bantu were skilled craftsmen. In the Nok sites, archaeologists have found ceramic sculptures. It appears that Nok artists shaped solid block of clay, carved the clay like wood, and burnished the carvings. Other Bantu artists carved wood and soapstone and cast bronze.

Mathematics

Bantu-influence mathematics were either base 20 or base two. The ancient Africans played math logic games, used geometric inspiration in their art, and village structure.

Metallurgy

Bantu craftsmen worked with iron, gold, and copper to create weapons, farm implements, and jewelry.

Sources

http://www.timemaps.com/store/timemaps/2012/12/newafrica_500bc.jpg

"Ancient Civilizations in Africa, 3500 B.C.-500 B.C." *DISCovering World History*, Gale, 2003. *Student Resources in Context*, link.galegroup.com/apps/doc/EJ2105230006/SUIC?u=bcps&xid=8d036408. Accessed 3 Feb. 2017.

http://study.com/academy/lesson/the-bantu-people-migration-language-and-impact.html

http://study.com/academy/lesson/ancient-west-africa-bantu-migrations-the-stateless-society.html

Sample Instructional Activities/Assessments

What does architecture say about a society?

Description:

Students will look at an image of a modern building (Mercedes Benz Stadium) and make generalizations about the society that built it.

Show an image of the Mercedes Benz Stadium. Have students spend about 2 minutes writing about what they notice about the stadium.

Have students share the details they notice.

Ask students what the purpose of the building is?

Ask students what they building reveals about the technology of our society.

Draw a connection between the discussion and the lesson. We can determine a great deal about a society based on the art and architecture of that society.

GSE Standards and Elements	SSWH1 Analyze the origins, structures, and interactions of societies in the ancient world from 3500 BCE/BC to 500 BCE/BC.
Literacy Standards **Social Studies Matrices** **Enduring Understanding(s)**	Literacy Standards: L0-10WHST9: Draw evidence from informational texts to support analysis, reflection, and research. Information Processing Skills: 10. Analyze artifacts. 11. Draw conclusions and make generalizations. Enduring Understandings: The student will understand that location affects a society's economy, culture, and development. The student will understand that technological innovations have consequences, both intended and unintended, for a society.

Aerial view of Mercedes Benz Stadium, Atlanta, GA. Retrieved from:
http://icdn4.digitaltrends.com/image/mercedes-benz-stadium-construction-7-1416x990.jpg

Sample Instructional Activities/Assessments

Archaeological Thinking

Description:

Students will participate in an *Archaeological Thinking Lesson* from the Smithsonian Institute to introduce the use of partial artifacts to tell the story of a society. They will analyze objects simulating the work of an archaeologist, and then through class discussions, link their in-class experience with the reality of the struggle to reconstruct history through fragments of objects left behind by a society.

GSE Standards and Elements	SSWH1 Analyze the origins, structures, and interactions of societies in the ancient world from 3500 BCE/BC to 500 BCE/BC.
Literacy Standards **Social Studies Matrices** **Enduring Understanding(s)**	Literacy Standards: L0-10WHST9: Draw evidence from informational texts to support analysis, reflection, and research. Information Processing Skills: 1. Compare similarities and differences. 10. Analyze artifacts. 11. Draw conclusions and make generalizations. 15. Determine the adequacy and or relevancy of information. Enduring Understandings: The student will understand that location affects a society's economy, culture, and development. The student will understand that technological innovations have consequences, both intended and unintended, for a society.

ARCHAEOLOGICAL THINKING

Materials

- Four or five small paper or plastic bags.
- Artifacts (nontoxic refuse from the school building).
- Copies of Archaeological Thinking Worksheet.
- Pens or pencils.

Preparing for the lesson

Choose four or five areas in your school with which students are familiar (e.g., your classroom, the cafeteria, and the library). Observe each location, noting what students commonly do there (e.g., study, eat, and socialize). After school hours or when the areas are clear of students, examine the trash and recycle bins and the floors for evidence of those student activities. Select artifacts
(e.g., portions of candy wrappers, plastic from pen caps, and portions of student papers) that can help to tell the story of each site. Place each site's artifacts in a separately numbered bag (numbered 1 through 4 or 5).

Introducing the lesson

Show the clip from *Raiders of the Lost Ark* "The Golden Idol": https://youtu.be/mC1ikwQ5Zgc
Have students debrief by describing the work of an archaeologist based on the video.

Discuss the difference between historians and archaeologists by asking your students how we know that an event happened in the past. Tell your students that historians use all of these recorded sources to understand the past. *(Be sure to note that not all societies have kept records and that records can often be incomplete or biased.)* Next, ask your students how they might learn about a past event if they could not read about it or view it. Some students may find this question difficult. Ask them to think about the work of an archaeologist—what does this type of researcher look for? Students should conclude that an archaeologist seeks physical evidence (clues) of the past.

Using the Introduction as a guide, tell your students that they will be learning how archaeologists use physical evidence in the form of artifacts (human-made objects) to learn about the past. Tell them to imagine that an archaeological expedition at your school has recently uncovered a number of artifacts that the class must now examine and interpret. Stress that the students were picked for this job because they were the foremost experts on the archaeological sites.

Divide your class into four or five groups of equal size. Give each student a copy of Worksheet 1 and provide each group with one of the numbered bags of artifacts. Direct your students to open the bags and carefully examine each object. Ask them to consider what each object is made of and how it may have been used. *(Tell students to put this information on their worksheets.)* Students may find some objects easier to identify than others. Walk among the groups and provide hints as necessary. After the students have identified the objects, ask them to speculate where these objects may have been found. (Tell students to put this information on their worksheets.)

Ask a representative from each group explain its interpretation of the objects. Provide explanations of the objects and their contexts as necessary. Emphasize that archaeologists are often challenged with interpreting artifacts that they cannot immediately identify or date.

Conclude the activity by leading a discussion linking the class activity to the work of archaeologists to reconstruct the history of a society through artifact analysis. Complete a T-Chart comparing the activity to the work of an archaeologist.

Inspired by: "Art to Zoo Decoding the Past: The Work of Archaeologists," November/December 1995, retrieved from: http://www.smithsonianeducation.org/educators/lesson_plans/decoding_the_past/.

Archaeological Thinking Worksheet

Directions: Use the table below to record your observations about the artifacts in your bag(s).

Bag Number:

Object	Material(s) of construction	What is it used for? (function)

"Art to Zoo Decoding the Past: The Work of Archaeologists," *November/December 1995,* retrieved from: http://www.smithsonianeducation.org/educators/lesson_plans/decoding_the_past/.

Sample Instructional Activities/Assessments

Analysis of Ancient Art and Architecture

Description:

Students will analyze placards (Documents 1 – 11) with photographs of art and architecture from ancient societies and predict what materials were used and what technology would have been interested. Students will draw conclusions about ancient technology based on the artifacts left behind by the civilizations.
Students will prepare a brief presentation to the class about one civilization. To conclude each lesson, project each placard. Have students working with on the placard present their findings by summarizing their answers.
Complete the lesson by discussing how art and architecture can teach us about technology as well as the society that created it.

After completing their placard analysis, students will write a Quick Write on the topic, "What does the technology used to create art and architecture tell us about society? Support your answer with specific details."

GSE Standards and Elements	**SSWH1 Analyze the origins, structures, and interactions of societies in the ancient world from 3500 BCE/BC to 500 BCE/BC.** a. Compare and contrast Mesopotamian and Egyptian societies, include: religion, culture, economics, politics, and technology. b. Describe the societies of India and China, include: religion, culture, economics, politics, and technology. d. Identify the Bantu migration patterns and contribution to settled agriculture. e. Explain the rise of the Olmecs.
Literacy Standards **Social Studies Matrices** **Enduring Understanding(s)**	Literacy Standards: L9-10RHSS1: Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information. L9-10WHST9: Draw evidence from informational texts to support analysis, reflection, and research. L9-10WHST10: Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. Information Processing: 1. Compare similarities and differences. 9. Construct charts and tables. 10. analyze artifacts. 11. draw conclusions and make generalizations. Enduring Understandings: The student will understand that technological innovations have consequences, both intended and unintended, for a society.

Matrix for Understanding Ancient Art and Architecture

Directions: Carefully examine the placard and describe what you see in each picture. Read the caption to help you understand what technology might have been required to create the art or architecture. Use the information on the diverse ancient cultures found at http://www.ancient.eu/ for additional information. When you have finished, take your matrix and placard to your teacher to be reviewed. Get another placard and repeat the process. You will present one of these artifacts to the class as a review of the lesson.

Figure/Civilization	Description	Tools Needed	What does it say about the civilization that produced it?
1 Mesopotamia			
2 Mesopotamia			
3 Egypt			
4 Egypt			
5 China			

6 China			
7 India			
8 India			
9 Bantu			
10 Olmec			
11 Olmec			

Technology, Art, and Architecture of the Ancient World Quick Write

What does the technology used to create art and architecture tell us about society? Support your answer with specific details.

Two Point Rubric

Points	Description	Notes
2	The response achieves the following: • gives sufficient evidence of the ability to justify interpretations of information • includes specific examples/details that make clear reference to the text • adequately supports examples with clearly relevant information from the text	
1	The response achieves the following: • gives limited evidence • includes limited examples that make reference to the text • explains the development of the author's idea within the text and the supporting information with limited details based on the text	
0	The response achieves the following: gives no evidence of the ability to determine and analyze the development/progression of an author's idea within the text.	

Sample Instructional Activities/Assessments

The Technology of Ancient Civilizations

Description: Students will read an informational text about the technology of various ancient civilizations and complete a matrix comparing the civilizations. Using the readings, students will complete a matrix comparing the technology of ancient civilizations.

GSE Standards and Elements	**SSWH1 Analyze the origins, structures, and interactions of societies in the ancient world from 3500 BCE/BC to 500 BCE/BC.** a. Compare and contrast Mesopotamian and Egyptian societies, include: religion, culture, economics, politics, and technology. b. Describe the societies of India and China, include: religion, culture, economics, politics, and technology. d. Identify the Bantu migration patterns and contribution to settled agriculture. e. Explain the rise of the Olmecs.
Literacy Standards **Social Studies Matrices** **Enduring Understanding(s)**	Literacy Standards: L9-10RHSS1: Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information. L9-10WHST9: Draw evidence from informational texts to support analysis, reflection, and research. Information Processing: 1. Compare similarities and differences. 9. Construct charts and tables. 11. Draw conclusions and make generalizations. Enduring Understandings: The student will understand that technological innovations have consequences, both intended and unintended, for a society.

Directions: Use the readings on the technology of ancient societies to complete the table below.

	Mesopotamia	Egypt	India	China	Bantu	Olmec
Agriculture						
Art and Architecture						
Machinery/ Tools						
Mathematics (including numerical base)						
Measurement and Time						
Metallurgy						
Textiles						
Transportation						
Writing System						