

Study Questions

The following study questions are designed for learning at the knowledge and comprehension levels of Bloom's Taxonomy. Answers are found within the Fact File. There is a separate section for each of the main topics: Waterworks, Road Systems, Agriculture, Building Construction and Inca Society. The following objectives are embedded within the study questions:

The learner will list the functions of the Inca waterworks system.

The learner will identify operational features of the waterworks system.

The learner will name characteristics of the Inca Empire.

The learner will list functions of the Inca road systems.

The learner will list characteristics of Inca agriculture.

The learner will identify features of Inca architecture.

The learner will identify elements of arts and recreation in Inca society.

The learner will describe how the waterworks system was adapted for different regions.

The learner will explain how the road systems were adapted for different regions.

The learner will describe the construction techniques used by the Inca.

The learner will explain characteristics of Inca religion.

The learner will summarize the process of stone working.

The learner will explain the Inca class system.

The learner will describe the Inca economic system.

The learner will explain the communication system used by the Inca.

Waterworks

The Inca constructed an elaborate waterworks system, the features of which were as varied as the purposes it served. The sophisticated engineering methods used in its development ensured the longevity of a system still functioning today. The answers to the following questions can be found by exploring the Waterworks section of the Fact File.

1. What regional obstacles did the Inca have to overcome in developing its waterworks system for its vast empire?

The climates and topography varied widely from desert areas, to highlands, to rainforest regions

2. What functions did the waterworks systems provide?

Hygienic and religious purposes as well as irrigation

3. The well-preserved ruins of Machu Picchu represent the Inca engineers' solid understanding of Urban planning.

4. In Machu Picchu the canal carried water from the spring to what?

The center of the city

5. The Inca built these to support the canals and they helped to resist sliding and settling of the land?

Terraces

6. When planning the site of Machu Picchu the Inca civil engineers had to take into consideration the canal grade to determine what?

Where the canal would discharge water into the first fountain

7. What was important about the first fountain?

The royal residence and religious sites were constructed at this site because the water was purest flowing from the first fountain

8. How did the Inca engineers increase the amount of water that came from Machu Picchu Mountain?

They built a series of water collection works

9. How many people could the waterworks system at Machu Picchu supply at any given time?

Up to 1000

10. List the different functions of the fountains in Machu Picchu.

Provide a domestic water supply, enhance the environment, and use for religious purposes

11. What environmental factor has affected the waterworks system at Machu Picchu today?

The government has water piped into the nearby tourist hotels or tourism

12. How many fountains were located in Machu Picchu?

16

13. What were the uses of the first three fountains in Machu Picchu?

The first fountain was for the royal residence and the second and third were for religious purposes

14. Describe and draw the basic design of a fountain.

Rectangular in shape, water flows from a canal into an opening and flows into a stone basin. The bottom of the fountain contains a one to two inch outlet that drains into a canal and on to another fountain

15. Before the Inca engineers built Machu Picchu what did they have to determine?

If the water supply was adequate for the city

16. Explain how the urban drainage system has allowed Machu Picchu to remain standing today.

Water collects in channels and deposits into the dry moat and then is carried outside the city. Storm drain outlets are built into walls to relieve water pressure

17. What percentage of construction of Machu Picchu took place underground?

60%

18. What were the containers that the Inca collected water in called?

Aryballos

19. What unseen feature has reduced the element of erosion at Machu Picchu?

The subsurface water drainage system

20. List the four levels of construction of the terracing for subsurface drainage.

1. Large rocks

2. Gravel

3. Sand

4. Topsoil

Road Systems

The Inca Empire consisted of desert coastlands, mountain ranges, open grasslands and jungle regions. An intricate system of roadways was built to connect this diverse and immense empire. The answers to the following questions can be found by exploring the Road Systems section of the Fact File.

1. The Inca Empire was comparable in size to what other great empire?

Roman

2. What modern day countries did the Inca Empire span?

Ecuador, Peru, Chile

3. The Inca road system covered how many miles?

15,000 miles

4. Explain how the Inca Empire got the name Tawantinsuyu.

The empire was divided into four quarters that converged in Cusco

5. What was the capital of the Inca Empire?

Cusco

6. During the reign of Pachacuti he expanded the empire and integrated the people using this form of communication?

Roadways connecting the entire empire to Cusco

7. Explain how the roads built during Pachacuti's reign were the lifelines of the Inca civilization.

They enabled the Inca army to be mobilized, opened communication between regions, and made trading easier throughout the empire

8. Were all of the roadways built by the Inca the same size? Explain.

No, they ranged from 20 feet wide avenues to small 3 feet wide footpaths

9. What was used to mark the distance along the main routes on the road system?

Large stones

10. Describe four ways Inca engineers overcame obstacles in building the road system.

Levees were built in swamp areas, bridges spanned the rivers, stairways were cut into the mountainsides, and tunnels were cut into living rock

11. Describe how road surface differed region to region.

Coastal regions used a hard packed mixture of clay, small stones and maize leaves, in the mountains the roads were lined with stone

12. What did the Inca use as the main means of transportation?

People and llamas

13. Why were roads in the mountainous regions built on steep gradients?

They did not use the wheel so footpaths were sufficient in those areas

14. Describe the different types of bridges the Inca engineers designed.

Pontoon bridges made by tying together boats and covering them with a wood walkway for slow moving water; Bridges made of stone and wood over swifter moving currents; Twisted rope cables attached by a large wooden hook; Suspension bridges made of rope; Draw bridges reinforced by the stone abutments

15. What material was used to make rope for bridges?

Hand woven ichu grass

16. What were rest stops called that the Inca built every 15 to 30 miles for the army to use?

Tambos

17. What was the purpose of Tambos?

They provided shelter, held supplies of food, drink, weapons and clothing for the army and Inca ruler to use

18. What was the most common gift offered to an altar along the roadside?

A stone to represent leaving the travelers weariness behind

19. Explain how the Inca postal system worked and give an example of its efficiency.

Relay runners called chasqui who lived in huts along the roadside would hand off a message from one runner to the next until the message was delivered; The system was so efficient that 250 miles could be covered in a single day and fresh fish from the pacific coast could be delivered to the Empire for dinner

20. The most famous section of the Inca road system is a thirty one-mile trek that leads into Machu Picchu. What is this called?

The Inca Trail

Agriculture

The Inca were some of the best agronomists in the world. The diversity of the geographic regions of the empire required the use of varied farming techniques. The answers to the following questions can be found by exploring the Agriculture section of the Fact File.

1. Which crops did the Inca grow in higher elevation areas?

Potatoes and quinoa

2. List the primary crops grown in the valley areas.

Corn, squash, beans, peppers, tomatoes, gourds and avocados

3. How did rotating crops improve crop yield?

Replenishing nutrients in the soil meant a better yield

4. Explain how farming methods were used in the following regions:

a. Desert areas: The Inca expanded the existing canals.

b. High plateau areas: The Inca raised a large area of topsoil above the basin of Lake Titicaca to create channels for insulation

5. List the three layers used in agricultural terracing.

Stone walls, layer of rubble of stone chips, 1.5 to 3 feet of topsoil

6. What fertilizer was used in some agricultural terracing?

Guano

7. How many acres of land were farmed with agricultural terracing?

Over 2.5 million acres

8. What was the staple of the Inca diet?

Vegetables

9. Why did the Inca redirect the course of the Urubamba River?

To provide more arable land by straightening the banks and lining them in stone

10. What impact have the Inca agricultural practices had on present day practices in the same regions?

Many of the same agricultural terraces and farming methods are still used today.

Building Construction

The advanced engineering methods used by the Inca are evidenced by the stone masterpieces they created centuries ago. The Inca mastered the collecting, cutting and transporting of stone to create the magnificent stone buildings still seen today at Machu Picchu. The answers to the following questions can be found by exploring the Building Construction section of the Fact File.

1. Describe the typical buildings made centuries ago by the Inca.

Single story, made of cut stone perfectly jointed together

2. What materials were used in coastal regions?

Adobe bricks, plaster

3. How did Pachacuti assimilate the accomplishments of the empires he conquered into the Inca Empire?

The Inca learned building, hydrological and agricultural techniques from the Huari and Tiwanaku empires

4. What special significance did stone have to the Inca?

Spiritual significance

5. List the characteristics of Inca architecture.

Solid, simple, symmetrical, yet there is beauty and coherence in the craftsmanship

6. Describe evidence of geometry in Inca building construction.

Inca doorways were trapezoidal, the polygonal construction of the Inca created a very tight fit between the stones, some stones have many angles such as in the sacristy

7. What is the name of the principal rock quarry used to build Machu Picchu?

Caos Granitico

8. Summarize the process of collecting and working the stones into four steps

- a. Bronze crowbars or wedges of wood were driven into the natural fault lines
- b. The wood was soaked causing a large fracture which would break the rock free
- c. Harder stones were used to cut the rocks to the size needed
- d. Stones were moved to the construction site

9. What is the local granite composed of?

Quartz, feldspar and mica

10. What were the other two stones used sparingly at Machu Picchu?

Pink granite, green talc

11. How did the Inca transport the massive boulders over steep banks?

They used ramps

12. How many workers were estimated to move some of the larger boulders?

2400

13. What was the purpose of thatched roofs?

They allowed rainwater to runoff

14. What were the great halls called that were found at Inca royal or administrative sites?

Kallankas

15. How were the great halls used?

Commoners from surrounding regions would come to celebrate festivals and eat and drink together

16. Describe the wayronas built by the Inca.

Rectangular, 3-walled structures with open fronts and thatched roofs

17. How were wayronas used?

Way stations, resting places and places to socialize

18. Describe double-jamb doorways.

Made with extra layer of stone, trapezoidal in shape

19. Could anyone enter a double-jamb doorway? Explain.

No, only high standing people such as nobility or religious leaders could enter

20. Where did the double-jamb doorways lead?

To residences of nobility and religious leaders, or to important religious buildings

Inca Society: Governance

The class system within the Inca Empire defined many aspects of the society. Each individual, young or old had responsibilities within the empire. Artifacts recovered at the site reveal a well-organized and maintained social order. The answers to the following questions can be found by exploring the Inca Society section of the Fact File.

- Each type of ruler had a different type of regional responsibility. Below, draw a line from the type of ruler to the correct level of regional responsibility.

RULER	REGIONAL RESPONSIBILITIES
Apo or Prefects	Supreme authority over the realm
Curacas	Four quarters of Tawantinsuyu
Governors	Administrative towns
Sapa Inca or Emperor	Oversee small villages, mediators between ruling Inca class and small communities

- What was the status of the Sapa Inca?

- Living god, divine

- Describe the rituals and restrictions that dealt with the Sapa Inca.

Clothing was ceremonially burned after one use, along with hair, nail clippings and uneaten food

- Why were the rituals performed?

To prevent sorcery from being committed against the emperor

- Was anyone allowed to see the emperor face-to-face? Explain.

Only those of great importance could visit the emperor, and usually a screen was used

- List the two ways that taxes were collected in the empire.

a. Adult males performed labor called mita

b. Goods were collected

- Did everyone pay taxes? Explain.

No, blood descendants or orejones were not required to pay

- Describe the treatment of a Sapa Inca who died?

The mummy was waited on by servants, treated with respect and taken on trips to visit living relatives

9. Who wore large ear spools made of gold, silver and wood?

- Blood descendants of the emperor

10. List two ways that an individual became part of the noble class.

Nobility, privilege

11. Who usually collected the mita?

Curacas

12. What role did the hatun runa play in society?

They made up the military, provided for agricultural needs, and were the artisans

13. What is an ayllu?

A community composed of family members that share water rights, land, herds and labor

14. Complete the following chart showing the responsibilities of each member of the hatun runa.

AGE	FEMALE JOBS	MALE JOBS
5-9	<u>Care for smaller children, run errands</u>	<u>Care for the herd, keep birds from the crops</u>
9-12	<u>Weaving, dyeing cloth, human sacrifice, serve the emperor</u>	<u>Hunt for fowl</u>
Teens	<u>Care for the herd, weaving, food preparation, tend the fields, household chores</u>	<u>Guard flocks, help in the fields, imperial messengers called chasqui</u>
Adults-age 50	<u>Weavers, mothers</u>	<u>Farmers, herders</u>

15. Why was being a beautiful girl in Inca society dangerous?

Beautiful girls were chosen for human sacrifice

16. List the three golden rules of Inca society.

- Do not steal, lie or be lazy

Inca Society: Economy

The class system within the Inca Empire defined many aspects of the society. Each individual, young or old had responsibilities within the empire. Artifacts recovered at the site reveal a well-organized and maintained social order. The answers to the following questions can be found by exploring the Inca Society section of the Fact File.

1. Explain reciprocal exchange.

The Inca would exchange goods and perform labor for the government

2. What was the theory behind the economic system for the Inca?

The government cared for the citizen, while the citizen was responsible for working

3. What kept the state alive and supported the emperor and noble class?

The mita or labor tax

4. What was the responsibility of the quipocamayos?

Accounting tasks such as keeping track of the goods collected from the commoners

5. What did the hatun runa's life revolve around?

The calendar handed down from the emperor and religious authorities

6. Who wore simple tunics or dresses with no jewelry?

The commoners or hatun runa

7. Who wore jewelry and elegant clothing?

The emperor and noble class

8. Who were required to eat their meals outdoors?

The commoners or hatun runa

9. Who were allowed many wives?

The nobility

10. How did the commoners supplement their diet?

They raised guinea pigs; hunted fowl, deer and wild camels called guanaco or ate llamas

Inca Society: Religion

The class system within the Inca Empire defined many aspects of the society. Each individual, young or old had responsibilities within the empire. Artifacts recovered at the site reveal a well-organized and maintained social order. The answers to the following questions can be found by exploring the Inca Society section of the Fact File.

1. Where was the headquarters of the Inca government and religion located?

Cusco

2. How frequently did the Inca take part in religious ceremonies?

Over 120 days a year, or at least three days a month from the Inca calendar

3. What role did the religious observances play for the emperor?

They helped legitimize the emperor's political power and control, thus creating ties to the commoners

4. Where did the food and drink used in the festivals come from?

The emperor provided it from the storage facilities that were used to collect the mit'a tax

5. List four reasons the Inca would feast.

Marriages, to remember the dead, to mark stages in the agricultural year, and to honor those who reached maturity

6. What was the significance of a huaca?

They were believed to hold special powers or spirits, so the Inca left offerings to honor them

7. List three examples of an Inca huaca.

Mountains, caves, rivers, rocks, tombs, lakes, springs

8. How did the Inca belief in huacas possibly contribute to the well-preserved condition of Machu Picchu?

Because it is surrounded by huacas in the form of mountains, rivers and springs, their belief may have influenced their gentle treatment of Machu Picchu

Inca Society: Communication

The class system within the Inca Empire defined many aspects of the society. Each individual, young or old had responsibilities within the empire. Artifacts recovered at the site reveal a well-organized and maintained social order. The answers to the following questions can be found by exploring the Inca Society section of the Fact File.

1. What was Quecha?

The official spoken language of the Inca empire

2. Did the Inca communicate in writing?

No

3. What were the benefits of the roadway system created by Pachacuti?

The Inca army could be moved quickly, communication was spread throughout the empire, trading was easier

4. Describe the device used to maintain the records of the state.

The quipu was a knotted set of strings that were color-coded to represent information in base ten units to track cloth, animals and taxes

5. Who used the quipu?

The quipocamayos or Inca accountants

Inca Society: Arts & Recreation

The class system within the Inca Empire defined many aspects of the society. Each individual, young or old had responsibilities within the empire. Artifacts recovered at the site reveal a well-organized and maintained social order. The answers to the following questions can be found by exploring the Inca Society section of the Fact File.

1. What was the significance of poetry recitation?

The poems focused on oral remembrance of significant events of Inca history, and they are still passed down in this manner in the Andes

2. What kinds of instruments were prevalent in Inca society?

Trumpets, flutes, and other wind and percussion instruments

3. What props were used in dancing?

Masks, animal skins and farming tools

4. Who wore cumbi cloth?

The emperor and his family

5. What feature of Inca society separated the people into classes?

The pattern and insignia on the clothing worn represented military status, and the region and family each individual belonged to

6. Did the metal worker and potters perform agricultural duties? Explain.

No, they were freed from their agricultural duties and moved to Cusco to create luxury items for Inca nobility and religious leaders