

The Byzantines Engineering An Empire Worksheet Answers

NAME: CT HR: DATE: _____

Engineering an Empire: The Byzantines

1. What is the strip of water connecting Europe to Asia, and the Mediterranean Sea to the Black Sea, called? Bosphorus
2. What religion was Constantinople founded on? Christianity (Orthodox)
3. What is Constantinople called in the modern world? Istanbul
4. When built an aqueduct that stretched how many miles? 400 miles
5. Where was water stored in Constantinople? Underground Cisterns (Sisterna Basilica)
6. How much water could the Basilica Cistern hold? 87,000,000 gallons
7. By the end of the 5th century what was the population of Constantinople? 1.0 million
8. What was used to make the Theodosian walls "invincible proof"? Iron and marble (layered with brick)
9. Did Attila the Hun ever capture Constantinople? No
10. How long was the chain that blocked the harbor? 5 hundred fathoms (1,000 ft)
11. What was Justinian's rule known as for Byzantium? Golden Age
12. What was Justinian when he moved to Constantinople? Emperor
13. How many people could the Hippodrome hold? 100,000
14. What did Justinian do to the people rising at the Hippodrome? Killed them all (50,000 executed)
15. What is the architectural legacy of Justinian? Hagia Sophia
16. How large is the dome (cross) that sits on the Hagia Sophia? 100 ft
17. How high up does the dome sit? 184 ft
18. Roughly how long did it take to build the Hagia Sophia? Less than 6 weeks
19. How did later architects fix the problem with the dome being able to support its own weight? Added the piers of the dome (21 ft taller)

The Byzantines Engineering an Empire Worksheet Answers provide an insightful examination of the intricate complexities and innovations that characterized Byzantine civilization. This worksheet serves as a valuable tool for students and historians alike to explore the multifaceted aspects of Byzantine engineering, architecture, military strategies, and administrative systems that enabled the empire to thrive for over a thousand years. Below, we will delve into various components of Byzantine society that contributed to their reputation as one of the most advanced civilizations of their time.

Engineering and Architecture

Byzantine engineering was marked by impressive architectural achievements and advancements in construction techniques. The empire is renowned for its grand churches, fortifications, and infrastructure that showcased both aesthetic beauty and functional design.

1. Architectural Innovations

- Domes and Arches: One of the most significant contributions of Byzantine architecture was the use of the dome. The Hagia Sophia is a prime example, featuring a massive dome that appears to float above the nave. The use of

pendentives allowed for the seamless transition from a square base to a circular dome.

- **Basilica Design:** Byzantine churches often followed a cruciform plan with a central dome. The basilica design incorporated a longitudinal axis and featured narthexes, transepts, and apse, which created a balanced and symmetrical structure.

- **Mosaics:** Byzantine artists used mosaics extensively to adorn walls and ceilings, employing colored glass and stone to create intricate images of religious figures and scenes. These mosaics were not just decorative but also served to convey theological messages.

2. Engineering Techniques

- **Use of Concrete:** The Byzantines perfected the use of concrete in construction, allowing for the creation of larger and more durable structures. This innovation was crucial in building extensive fortifications and monumental buildings.

- **Aqueducts and Water Systems:** Byzantine engineers constructed aqueducts to supply cities with fresh water. These systems included extensive networks of pipes and reservoirs, showcasing their understanding of hydraulics and urban planning.

- **Fortifications:** The construction of walls and fortresses, such as the Theodosian Walls of Constantinople, demonstrated advanced military engineering. These fortifications utilized a combination of stone and brick, and their design allowed for effective defense against sieges.

Military Engineering

Byzantine military engineering was crucial in maintaining the empire's territorial integrity and sovereignty. The strategic use of technology and fortifications played a significant role in their military success.

1. Byzantine Warfare Strategies

- **Greek Fire:** One of the most feared weapons of the Byzantine military was Greek fire, a flammable liquid that could ignite on water. It was used effectively in naval battles and sieges, providing the Byzantines with a significant tactical advantage.

- **Heavy Cavalry:** The Byzantine army relied on heavily armored cavalry units known as cataphracts. These soldiers were trained to charge in formation,

creating a formidable presence on the battlefield.

- Siege Warfare: The Byzantines were well-versed in siege tactics, employing advanced techniques to breach enemy fortifications. This included the use of siege towers, battering rams, and mining operations.

2. Defensive Structures

- Walls and Towers: The construction of thick walls and strategically placed towers around cities was essential for defense. The Theodosian Walls of Constantinople included multiple layers and towers that provided vantage points for archers and soldiers.

- Moats and Barriers: Many Byzantine cities were protected by moats, which made it difficult for enemies to approach the walls. Barriers such as spikes and ditches were also employed to deter infantry assaults.

- Watchtowers: The use of watchtowers along trade routes and borders allowed the Byzantines to monitor enemy movements and respond quickly to potential threats.

Administrative Systems

An efficient administration was vital for the governance of the vast Byzantine Empire. This included the development of bureaucratic structures, taxation systems, and legal codes.

1. Bureaucracy and Governance

- Centralized Administration: The Byzantine Empire had a highly centralized administrative system. The emperor held supreme power, supported by a bureaucracy that was responsible for various aspects of governance, including tax collection, military recruitment, and public works.

- Provincial Administration: The empire was divided into provinces, each governed by a strategos or governor who was responsible for local administration and military defense. This structure allowed for effective management over vast territories.

- Legal Codes: The Codex Justinianus, compiled under Emperor Justinian I, was a monumental legal work that standardized laws throughout the empire. It laid the foundation for Byzantine law and influenced legal systems in Europe for centuries.

2. Taxation and Economy

- **Tax Systems:** The Byzantine economy relied on a complex taxation system that included land taxes, trade tariffs, and various levies. This revenue was crucial for funding the military and public infrastructure.
- **Trade and Commerce:** The strategic location of Constantinople made it a hub for trade between Europe and Asia. The Byzantines engaged in extensive trade networks, exchanging goods such as silk, spices, and precious metals.
- **Currency and Banking:** The introduction of gold coins, particularly the solidus, established a stable currency that facilitated trade and commerce. Byzantine banking practices also emerged, allowing for loans and the transfer of funds.

Conclusion

The Byzantines Engineering an Empire Worksheet Answers encapsulate the remarkable achievements of the Byzantine Empire in engineering, architecture, military strategy, and administration. The innovations and systems established by the Byzantines not only contributed to the longevity of their empire but also left an indelible mark on subsequent civilizations. By understanding the intricate details of Byzantine engineering and governance, we gain valuable insights into how this empire managed to flourish in a world filled with challenges and transformations. The legacy of the Byzantines continues to influence modern architecture, military strategy, and administrative practices, making their contributions a vital part of world history.

Frequently Asked Questions

What were the key architectural innovations of the Byzantine Empire?

The Byzantine Empire is known for its use of domes, particularly in the construction of Hagia Sophia, and the development of pendentives, which allowed for the placement of a dome over a square room.

How did Byzantine engineering contribute to urban planning?

Byzantine engineering included advanced urban planning with features such as aqueducts, road systems, and fortified walls, which helped cities thrive and defend against invasions.

What materials were commonly used in Byzantine construction?

Byzantine builders used materials such as brick, stone, and mortar, often incorporating decorative elements like mosaics and marble to enhance the aesthetics of their structures.

In what ways did Byzantine engineering influence later architectural styles?

Byzantine engineering influenced Romanesque and Gothic architecture through its innovative use of arches, domes, and intricate decorative techniques, shaping the development of Western architecture.

What role did the Byzantine Empire's location play in its engineering achievements?

The strategic location of the Byzantine Empire at the crossroads of Europe and Asia facilitated the exchange of ideas and technologies, which contributed to its advanced engineering achievements.

How did the Byzantine Empire utilize military engineering?

The Byzantine Empire excelled in military engineering by creating formidable fortifications, siege weapons, and defensive structures like the Theodosian Walls, enhancing its military strength.

What was the significance of the aqueducts in Byzantine cities?

Aqueducts were crucial for supplying fresh water to Byzantine cities, supporting public health, sanitation, and the overall growth of urban populations.

How did Byzantine engineering reflect the empire's cultural values?

Byzantine engineering reflected the empire's cultural values through the integration of religious themes in architecture, such as churches designed to inspire awe and convey the glory of God.

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