

Grades: 9-12

Nova, "The Emperor's Ghost Army"

In central China, a vast underground mausoleum conceals a life-size terracotta army of cavalry, infantry, horses, chariots, weapons, administrators, acrobats, and musicians, all built to serve China's first emperor, Qin Shi Huang Di, in the afterlife. Lost and forgotten for over 2,200 years, this clay army, 8,000-strong, stands poised to help the First Emperor rule again beyond the grave. Now, a new archaeological campaign is probing the thousands of figures entombed in the mausoleum. With exclusive access to pioneering research, "Emperor's Ghost Army" explores how the Emperor directed the manufacture of the tens of thousands of bronze weapons carried by the clay soldiers. NOVA tests the power of these weapons with high-action experiments and reports on revolutionary 3D computer modeling techniques that are providing new insights into how the clay figures were made, revealing in the process the secrets of one of archaeology's greatest discoveries.

After watching this episode, choose from the following questions and/or tasks to extend your learning

Question Box 1

- Describe the 8th wonder of the world.
- How could the archaeological find have been lost and forgotten for over 2,200 years?
- What other discoveries surrounded the mausoleum?
- What is a mausoleum and why were they built?
- What was the first empire to rule China?
- Who made the terracotta army? Why was it made?
- Who was Qin Shi Huang Di? How did he rule China?
- How did the Emperor manufacture the tens of thousands of bronze weapons carried by the clay soldiers?
- What experiments does NOVA perform on this archeological find? What do these experiments reveal?
- What new insights does the 3D computer modeling technique reveal as to how the clay figures were made?
- What secrets of archaeology's greatest discoveries are revealed through this investigation?

Question Box 2

- Why do you think the emperor ordered this to be built? Why is that even important?
- What would you build if you had unlimited resources? Why?

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- How do you feel about this program? Why?
- What is a legacy? Why are legacies important? What do you think your legacy will be?

Box 3 (Tasks)

- There were 40,000 pieces of bronze weaponry and 8,000 clay soldiers. Most of the figures were arrowheads that were in bundles of 100 units. Use mathematics to explain how the weapons might have been distributed among the clay soldiers.
- The figures are assumed to have been made on a type of assembly line. There are ten different face types, which indicate they were most likely made from molds. Clay was added after the assembly to make each figure appear different. Use mathematics and the concept of combinatorics to determine how 8000 different looking soldiers were made.
- Design a poster about you and the legacy you hope to leave. Share your attributes.

Box 4 (Enrichment)

- Research China's first emperor, Qin Shi Huang Di and present your findings. (ELD) present your findings orally to someone.
- China has a rich history of the arts (theater, dance, music and visual art). Explore the art of China and look for distinguishing features. Try to recreate some art that appeals to you.

Box 5 (Extend/Real-Life)

- Manufacturing has come a long way over the last 2,200 years. While it is less labor intensive it is the process of learning from mistakes that has made the manufacturing industry what it is today.
- Brainstorm a list of products that are manufactured.
- What materials would be needed to manufacture the products that you listed?
- Pick one of the products from your list and make a timeline of all the steps it would take to manufacture the raw materials to a finished product.
- Go to this link:
<https://www.youtube.com/user/DiscoveryTV/search?query=how+its+made>
- Select a How it's Made video for a product like or similar to the product you made the timeline for.
 - As you watch the video write down each step as they occur.
 - How accurate was your timeline? How many steps did you leave out?
 - Describe one step that you were surprised by or that interested you the most. Why did it surprise or interest you?
- Google manufacturing jobs in the Inland Empire.
- Select one listing that interests you.
 - Job title
 - Salary
 - Shift

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- Description of duties
- Required education or experience.
- Go to the link below and using the information in the poster answer the following questions: <https://desertcolleges.org/docs/posters/career-ready/sectors/sector-posteradv-mfg.pdf>
- What type of manufacturing has the most job openings?
- What is the median pay for this career?
- What community college could you attend that offers a program in this career field?
- Would you consider a career in manufacturing? Why or why not?
- Supplemental Question
- How has the manufacturing industry been challenged during the COVID 19 pandemic? Discuss your findings with a family member.