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Unit

# 4

# When archaeology meets technology

## Learning objectives

**After studying this unit, you  
will be able to:**

- identify how new technologies help accelerate archaeological discoveries;
- describe the use of innovative technologies in archaeological excavations;
- use counterarguments to strengthen your point;
- present China's archaeological contributions to the world.





## Unlocking the topic

### Setting the scene

As *Homo sapiens*, we are not only committed to exploring the future but also obsessed with digging into our past. It seems no one has ever failed to be fascinated by the mysterious symbols or intricate artifacts unearthed in ancient tombs or ruins. The new digital era is making this whole process increasingly faster and easier. What new technologies have been applied in archaeology? How do they help us unveil the past, understand the present, and predict the future?

To explore these questions, an international association of amateur archaeologists is hosting a forum themed “Technological Advances in Archaeology.” They are inviting people to present their own countries’ archaeological contributions to the world. You and your peers have decided to join the forum.

What will you share? How deeply have you dived into the fusion of archaeology and technology?



### Activating subject knowledge



Scan the code and complete the knowledge activation exercise on Ucampus.





## Viewing to know

### Word bank

**dodge** /dɒdʒ/ v. 躲避

**shark-infested** /ɪnˈfestɪd/

a. 大量鲨鱼出没的

**scale** /skeɪl/ vt. 攀登

**algorithm** /ˈælgə,rɪð(ə)m/

n. 算法

**indigenous** /ɪnˈdɪdʒənəs/

a. 当地的

**capture** /ˈkæptʃə/ vt. (用

文字或图片) 记录

**archaeobotanist**

/ˌɑːkiəʊˈbɒtənɪst/ n. 植物

考古学家

**legislation** /ˌledʒɪˈsleɪʃn/

n. 立法

## Pre-viewing

Work in groups and discuss the questions.

1. What are the common archaeological practices, and how have they evolved with the advent of digital technology?
2. In what ways does digital technology enhance archaeological practices in terms of data handling, site exploration, artifact study, etc.?



## Viewing and synthesizing



Video clip

What will happen when we use digital technology in the study of ancient rock art? Scan the code. Watch the video clip featuring archaeologist Dr. Jalandoni and complete the outline with what you hear.



### Overview of archaeological work

- Archaeology is one 1) \_\_\_\_\_, with archaeologists traveling around the world to uncover mysteries.
- Archaeological work is fascinating as it involves investigating 2) \_\_\_\_\_ to understand people and their cultures.

### Technology in use

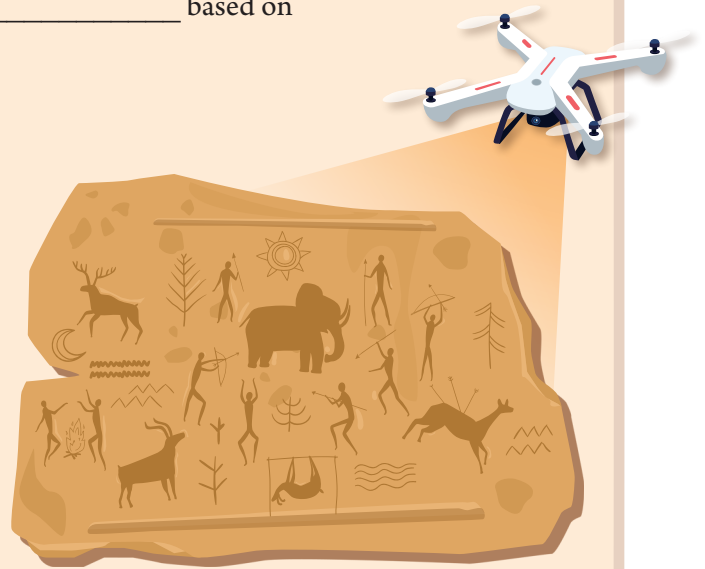
- 3D technology is considered a(n) 3) \_\_\_\_\_.
- 3D technology enables the discovery of new works of art unseen with the 4) \_\_\_\_\_.
- 3D technology helps preserve artwork and continue 5) \_\_\_\_\_ in cultural heritage.

### Multi-disciplinary paths to archaeology

You can combine archaeology with different 6) \_\_\_\_\_ based on your interests.

### Future prospects of archaeology

- Archaeology can be used to enrich and heal the relationship between peoples and cultures, and strengthen the 7) \_\_\_\_\_ between them.
- A key focus for the future is how to preserve rock art for everyone to enjoy, and how to 8) \_\_\_\_\_ in future generations.



## Viewing and discussing

### Work in groups and discuss the questions.

1. In addition to the 3D technology mentioned in the video clip, what other technologies can be used in archaeology?
2. As Dr. Jalandoni said, whether you are interested in arts or science, there is a place for you in archaeology. If you have the opportunity, which discipline would you like to choose to combine with archaeology and why?



## Reading to explore

### Reading 1



Log on to Ucampus for interactive learning.



# Accelerating archaeological discoveries helps refine the human story

**Taung Child** 汤恩孩童（南非汤恩地区发现的一具头骨化石）

**proto-human** /ˈprəʊtəʊ ˈhju:mən/ *n.* 原人

**hominin** /ˈhɒmɪnɪn/ *n.* 原始人类

**dental plaque** /plɑ:k, plæk/ 牙菌斑

**Homo sapiens** /ˈhəʊməʊ ˈsæpiənz/ *n.* 智人（现代人的学名）

**Hobbit** /ˈhɒbɪt/ *n.* 霍比特人（在印度尼西亚的弗洛勒斯岛上发现的古人类物种）

- 1 **I**n 1924, a three-year-old child's **skull** found in South Africa forever changed how people thought about human origins.
- 2 The **Taung Child**, our first encounter with an ancient group of **proto-humans** or **hominins**, was a turning point in the study of human evolution. This discovery shifted the focus of human origins research from Europe and Asia onto Africa, setting the stage for the last century of research on the continent and into its “Cradle of Humankind.”
- 3 Few people back then would've been able to predict what scientists know about evolution today, and now the pace of discovery is faster than ever. Just 20 years ago, no one could have imagined what scientists know two decades later about humanity's distant past, let alone how much knowledge could be **extracted** from a **thimble** of dirt, a **scrape** of **dental plaque**, or satellites in space.
- 4 Human fossils are outgrowing the family tree. Archaeologists previously thought **Homo sapiens** evolved in Africa around 200,000 years ago, but fossils discovered in Morocco have pushed that date back to 300,000 years ago, consistent with ancient DNA evidence. This raises doubts that our species emerged in any single place. Discoveries from Europe and Asia in this century show that from **enigmatic** “**Hobbits**” on the

Indonesian island of Flores to the **Denisovans** in Siberia, our ancestors may have encountered a variety of other hominins when they spread out of Africa. In 2019, researchers reported a new species from the Philippines. **Anthropologists** are realizing that our *Homo sapiens* ancestors had much more contact with other human species than previously thought. Today, human evolution looks less like Darwin's tree and more like a **muddy, braided** stream.

**Denisovan** /de'ni:səvən/ *n.* 丹尼索瓦人（在西伯利亚南部阿尔泰山脉的丹尼索瓦洞发现的古人类物种）

<sup>5</sup> What has accelerated the pace of archaeological discoveries?

<sup>6</sup> First of all, the new science of ancient DNA reveals old relationships. Since scientists fully **sequenced** the first ancient human **genome** in 2010, data from thousands of individuals have shed new insights into our species' origins and early history. One shocking discovery is that although our **lineages** split up to 800,000 years ago, modern humans and **Neanderthals** mated a number of times during the last Ice Age. This is why many people today possess some Neanderthal DNA.

**sequence** /'si:kwəns/ *vt.* 测定序列  
**genome** /'dʒi:nəʊm/ *n.* 基因组

<sup>7</sup> DNA is not the only **molecule** revolutionizing studies of the past. Other biomolecules are also making the invisible visible. **Paleoproteomics**, the study of ancient proteins, can determine the species of a fossil and recently linked a three-meter-tall, 600-kg **extinct ape** that lived nearly two million years ago to today's **orangutans**. **Lipid residues** trapped in **pottery** have revealed the origins of milk **consumption** in the Sahara and showed that **oddly** shaped pots found throughout Bronze and Iron Age Europe were ancient baby bottles.

**lineage** /'liːniɪdʒ/ *n.* 血统；世系  
**Neanderthal** /ni'ændə'tɔ:l/ *n.* 尼安德特人（在德国尼安德河谷发现的古人类物种）

**molecule** /'mɒlɪkju:l/ *n.* 分子  
**paleoproteomics**  
/ˌpeɪliəʊˌprəʊtɪ'ɒmɪks/ *n.* 古蛋白质组学

**orangutan** /ɔːræŋu:'tæn/ *n.* 红毛猩猩  
**lipid** /'lɪpɪd/ *n.* 脂质

<sup>8</sup> **Dental calculus** is particularly informative, revealing everything from who was drinking milk 6,000 years ago to the surprising diversity of plants in Neanderthal diets. Calculus can help scientists understand ancient diseases and how the human gut **microbiome** has changed over time. Researchers even find cultural clues – bright blue **lapis lazuli** trapped in a **medieval nun's** calculus led historians to reconsider who penned **illuminated manuscripts**.

**dental calculus** /'kælkjʊləs/ 牙石；牙垢

**microbiome** /ˌmaɪkrəʊ'baɪəʊm/ *n.* 微生物群系  
**lapis lazuli** /ˌlæpɪs 'læzjʊli/ *n.* 青金石；天青石

<sup>9</sup> While biomolecules help researchers **zoom** into **microscopic** detail, big data let them zoom out. For example, the widely available satellite imagery now enables researchers to discover new archaeological sites and monitor existing ones at risk. **Drones** flying over sites help investigate how and why they were made and combat **looting**.

**LiDAR** (Light Detection and Ranging) 激光雷达

**Stonehenge** /ˈstəʊnˈhendʒ/ *n.*  
巨石阵 (位于英国南部威尔特郡索尔兹伯里平原)

**Nazca** /ˈnæzkə/ **Lines** 纳斯卡线条 (位于秘鲁利马东南, 靠近现代城镇纳斯卡)

**transhumance** /trænsˈhju:məns/  
*n.* 季节移牧 (随季节迁移性放牧)


- 10 Scientists now also use the **LiDAR** technique to map three-dimensional (3D) surfaces and **visualize** landscapes on the earth, and as a result, ancient cities are emerging from dense vegetation in places like Mexico, Cambodia, and South Africa. Technologies such as Ground-Penetrating Radar help peer underground from the surface and are also revolutionizing the field – for example, revealing previously unknown structures at **Stonehenge**. More and more, archaeologists are able to do their work without even digging a hole.
- 11 These advances bring researchers together in exciting new ways. Teams of archaeologists are combining big **datasets** to understand large-scale processes. In 2019, over 250 archaeologists pooled their findings to show that humans have altered the planet for thousands of years, for example, with a 2,000-year-old **irrigation** system in China. Also new connections are raising new possibilities. In the Peruvian desert, over 140 new **Nazca Lines** were discovered using artificial intelligence to **sift** through drone and satellite imagery. With the wealth of high-resolution satellite imagery online, researchers are also turning to **crowdsourcing** to find new archaeological sites.
- 12 As new methods enable profound insights into humanity’s shared history, a challenge is to ensure that these insights are relevant and **beneficial** in the present and future. While people’s concern about our planet keeps rising due to environmental crisis, it may seem **counterproductive** to look back in time. Yet in so doing, archaeologists are providing **empirical** support for climate change and revealing how ancient peoples coped with challenging environments.
- 13 As one example, studies show that while industrial meat production has serious environmental costs, **transhumance** – a traditional practice of seasonally moving **livestock**, now recognized by UNESCO as intangible cultural heritage – is not only light on the land today, but helped promote biodiversity and healthy landscapes in the past.
- 14 Archaeologists today are contributing their methods, data and perspectives toward a vision for a healthier planet with a sustainable future. While it’s difficult to predict exactly what the next century holds in terms of archaeological discoveries, a new focus on “usable pasts” points in a positive direction.

# Reading and synthesizing

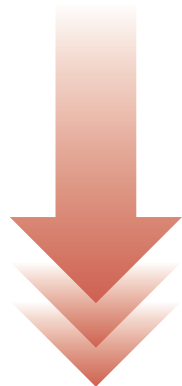
## Global understanding

Archaeological discoveries are happening faster than ever before, helping refine the human story. Read the passage and complete the table to find out what has accelerated archaeological discoveries.

Refining the human story



Technological advances



Significance

New evidence from fossils in Morocco and discoveries in Europe and Asia suggest that 1) \_\_\_\_\_ is more like a braided stream.

Technologies	Contributions	Examples
Biomolecules	Revealing old relationships	New studies of ancient DNA provide fresh perspectives on our 2) _____ and early history.
	Making the invisible 3) _____	<ul style="list-style-type: none"><li>• Paleoproteomics can identify the species of a(n) 4) _____.</li><li>• Dental calculus is highly 5) _____ about many aspects of ancient life and culture.</li></ul>
6) _____	Revealing big patterns	<ul style="list-style-type: none"><li>• Satellite imagery uncovers 7) _____ and keeps track of endangered ones.</li><li>• LiDAR technology creates 8) _____ maps and visualizes landscapes.</li><li>• Ground-Penetrating Radar enables 9) _____ examination from the surface.</li></ul>

- Bringing researchers together to open up new possibilities
- Offering 10) \_\_\_\_\_ toward a vision for a healthier and more sustainable planet

## Detailed understanding

Read the passage again and match the archaeological discoveries with their corresponding implications or insights.

### Archaeological discoveries

Fossils discovered in Morocco

1

“Hobbits” in Flores and Denisovans in Siberia

2

Connections between an extinct ape and modern orangutans

3

Lipid residues in ancient pottery

4

Previously unknown structures revealed at Stonehenge

5

Ancient irrigation systems in China

6

Over 140 new Nazca Lines

7

Transhumance which helps promote biodiversity and healthy landscapes

8

### Implications or insights

A

New technologies are revolutionizing this field by allowing archaeologists to explore hidden sites from the surface.

B

New discoveries challenged the idea that our species evolved in one specific place.

C

These traces revealed ancient dietary practices, such as the origins of milk consumption in the Sahara.

D

Our ancestors encountered a variety of other human species, suggesting that human evolution is not a linear process.

E

Collaborations among archaeologists are uncovering how humans have been shaping the environment for thousands of years.

F

The study of ancient proteins helps determine the species of fossils, showing the power of biomolecular technology to reveal invisible information.

G

Studying ancient practices offers valuable lessons for addressing contemporary issues.

H

AI and satellite imagery are transforming the way archaeological discoveries are made.

## Cultivating critical thinking

In the passage, the authors argue that examining the past is useful. Work in groups and explore how archaeological studies contribute to the present and future. Potential focus areas may include environmental protection, cultural heritage conservation, and urban planning. You may either expand this list with other relevant domains or conduct an in-depth analysis of a selected topic.



## Enhancing writing skills

### Using counterarguments to strengthen your point

Log on to Ucampus to get guidance from your AI tutor.



In essay writing, using counterarguments is an effective technique that can help strengthen your argument. Instead of merely stating your own perspective, you may introduce opposing viewpoints and challenge them. By doing so, you demonstrate a more comprehensive understanding of the topic and increase your credibility. It also allows you to anticipate and address potential objections, engaging your readers in a more meaningful way. The typical structure of a counterargument includes two steps: 1) introducing the opposing argument(s); 2) refuting the opposing argument(s). In Reading 1, the authors use a counterargument to strengthen their point in paragraphs 12 and 13.

In these two paragraphs, the authors raise a counterargument by acknowledging the rising concern for the environment and the potential perception that looking back in time might be counterproductive in addressing current environmental challenges. To counter this, the authors highlight the value of archaeology in providing insights into how ancient peoples adapted to challenging environments. Using the example of transhumance, the authors illustrate how this traditional practice not only has a minimal environmental impact today but also played a crucial role in promoting biodiversity and maintaining healthy landscapes in the past. This example effectively addresses the initial concern by demonstrating how historical practices can offer practical solutions and lessons for managing environmental issues in the present and future.



1. Read the following paragraph and explain how the author uses a counterargument to strengthen his point.

“

Some argue that advancements in technology, such as Ground-Penetrating Radar and 3D scanning, have made traditional archaeological methods obsolete. They believe these technologies can uncover hidden artifacts and structures more efficiently, minimizing the need for manual excavation. However, while technology offers valuable tools, it cannot fully replace the depth of understanding gained through hands-on excavation. Traditional methods, like stratigraphy and chronometric dating, reveal the subtle layers of history that technology may overlook. Moreover, these methods allow archaeologists to connect with the site and its cultural context in a way that machines cannot replicate. Thus, rather than making traditional methods obsolete, technology should enhance and complement these practices, providing a more complete and clearer approach to archaeological research.

”

2. Write an essay of no less than 150 words to discuss whether advanced archaeological technologies, like satellite imaging and automated excavation, compromise the meticulousness of traditional methods. Be sure to include a counterargument.

#### Functional language

Raising the opposing argument:

- Some people believe / argue / feel / think that ...
- It is often said / claimed that ...
- One common concern about (the issue) is ...
- Supporters of ... state that ...

Refuting the opposing argument:

- What this argument overlooks ...
- This view seems convincing / plausible / persuasive at first sight, but ...
- While this position is popular, it is not supported by the facts ...
- Although part of this claim is valid, it suffers from a flaw ...

## Reading 2



Log on to Ucampus  
for interactive learning.

# TECHNOLOGY IN ARCHAEOLOGY: Bridging China's past and present



- <sup>1</sup> In the realm of Chinese archaeology, a new **narrative** is **unfolding** – one where ancient **relics** and cutting-edge technology **intertwine**. As we **delve** into the mysteries of the past, modern innovations become our guide, illuminating paths once **shrouded** in **obscurity**.
- <sup>2</sup> Situated on the southern bank of the Yazi River in the Sichuan Basin of southwest China, the Sanxingdui site is believed to have been the capital of the ancient Shu Kingdom 4,500 to 3,000 years ago. The 1986 **excavation** brought the ancient Shu civilization to global attention, with a **remarkable array** of extraordinary masterpieces **unearthed**: a **radiant** gold mask, a 2.6-meter-tall bronze standing figure, and a towering 3.96-meter-tall bronze **sacred** tree, among others. These **artifacts** are unique in style and have sparked questions about the origins of the Shu culture and its role in Chinese civilization.
- <sup>3</sup> Since 2020, in the media **blitz** promoting the new round of Sanxingdui excavations, television cameras have focused on high-tech, climate-controlled **cabins** and advanced lab equipment, which promise to finally shed light on the site's **mysterious** artifacts. Each discovery at Sanxingdui now is not just a glimpse into history, but a **testament** to the power of technology to reveal the secrets of civilizations long forgotten.
- <sup>4</sup> To protect the unearthed artifacts, the archaeological team undertook **meticulous** preparations. A large **canopy** spanning over 2,000 square meters was **erected** to **shield** the site from sun and rain. Four glass

**blitz** /blɪts/ *n.* (为某个特殊目的的) 大规模行动

**cabin** /'kæbɪn/ *n.* 舱

**canopy** /'kænəpi/ *n.* 罩篷



**pit** /pɪt/ *n.* 坑

**crane** /kreɪn/ *n.* 起重机

**gear** /ɡɪə/ *n.* (为某场合或活动而穿的) 成套服装

**hyperspectral** /ˌhaɪpə'spektrəl/ *a.* 高光谱的

**truss-mounted** /ˈtrʌs'maʊntɪd/ *a.* 桁架式安装的

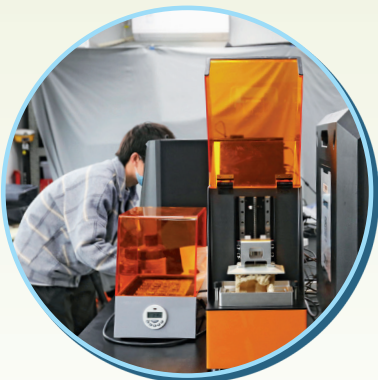
**infrared** /ˌɪnfər'red/ *a.* 红外线的

**spectrum** /ˈspektrəm/ *n.* (*pl.* **spectra**) 光谱

**composition** /ˌkɒmpə'zɪʃn/ *n.* 成分

structures, known as “archaeological cabins,” were constructed over six excavation **pits**, pioneering a new model for field archaeology. These cabins maintain constant temperature and **humidity** levels, **safeguarding** the artifacts from **drastic** environmental changes during excavation.

- 5 Each archaeological cabin is **outfitted** with an integrated excavation platform and a multifunctional operating system to efficiently excavate and transport unearthed artifacts. A **crane** **adept** at handling the extraction of various items is used. The platform can lower archaeologists, wearing protective **gear**, into the pits. This allows them to work **suspended** in midair while adjusting their position, direction, and angle to **minimize contamination** of artifacts and soil.
- 6 Beyond physical protection, cutting-edge imaging technologies play a **critical** role in **unraveling** the mysteries hidden underneath. In the Sanxingdui excavation, the archaeologists developed a **specialized** low-light archaeological **hyperspectral** imaging scanning system and a **truss-mounted infrared** hyperspectral imaging device. The scanning system captures the unique **spectral characteristics** of different artifacts within the pits, making **spectra** the “fingerprints” for identifying substances. The hyperspectral imaging device utilizes these spectral **signatures** to accurately determine material **compositions**. These tools help provide crucial data and technical support for studying the formation of the artifact pits, the **sacrificial** practices of the Sanxingdui culture, and the subsequent **restoration** and **preservation** of the various artifacts.
- 7 Using hyperspectral imaging technology, archaeologists can also **discern** and study aspects of ancient agriculture and textiles by analyzing the ashes and other materials in the pits. For instance, the nature of what appears to be **merely** black “soil **clumps**” to the naked eye is revealed through hyperspectral imaging and other advanced technologies. In Pit 4, **remnants** of silk products were discovered in this way. Subsequent testing confirmed the **presence** of silk proteins, providing solid evidence for the theory that ancient Shu was one of the important origins of silk in ancient China.



- 8 **Three-dimensional (3D) technology** also steps in to assist archaeologists in preserving newly uncovered treasures during excavations. This advanced technology was applied at multiple stages, significantly

enhancing the efficiency of the excavation process by enabling precise documentation and analysis, while ensuring the safety of the artifacts through non-invasive methods. For instance, the large *zun* vessel discovered in Pit 3, along with its internal fill, posed considerable challenges not only due to its substantial weight, but, more critically, its extreme fragility. Even a gentle touch risked causing damage. To ensure its safe extraction, on-site experts utilized 3D technology to create a custom solution. They began by scanning the bronze vessel to obtain a precise digital model, which was used to print a thin **silicone** cover to protect its surface. The *zun* was then placed in a wooden **crate** for **stabilization** and lifted out by using a cultural relic crane.

**silicone** /ˈsɪlɪkəʊn/ *n.* 硅酮; 硅树脂

**crate** /kreɪt/ *n.* 木箱; 板条箱

- <sup>9</sup> The archaeological team also employs many other advanced tools, such as video **microscopes**, scanning electron microscopes, and **portable** X-ray **fluorescence spectrometers**, which can help examine artifact details. Given that many artifacts rapidly **oxidize** upon **exposure** to air, the site is also equipped with organic and inorganic laboratories, including an emergency analysis lab, a **microtrace** emergency protection lab, a cultural heritage studio, and an archaeological studio. These facilities enable immediate physical and chemical testing of materials as they are unearthed. Additionally, eight high-resolution network cameras and an industrial **panoramic** camera are installed to record the entire archaeological process, with live video feeds transmitted to the on-site emergency **consultation** room, enabling remote expert consultations.

**microscope** /ˈmaɪkrəˌskəʊp/ *n.*  
显微镜

**fluorescence** /flɔːˈresns/ *n.* 荧光  
**spectrometer** /spekˈtrɒmɪtə/ *n.*  
光谱仪; 分光计

**oxidize** /ˈɒksɪˌdaɪz/ *v.* 氧化

**microtrace** /ˈmaɪkrəʊˌtreɪs/ *n.*  
微量痕迹 (如毛发、纤维等)

**panoramic** /ˌpænəˈræmɪk/ *a.*  
全景的

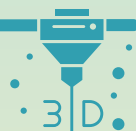
- <sup>10</sup> As one of the greatest archaeological discoveries of the 20th century, Sanxingdui stands as an awe-inspiring site in the **annals** of archaeology. The application of innovative technologies not only enhances the **precision** and depth of its excavation but also demonstrates the remarkable progress in Chinese archaeological science. These **advancements** deepen our understanding of China's 5,000-year history while offering fresh insights into the origins and complexities of Chinese civilization.

**annals** /ˈænlz/ *n.* [pl.] 年鉴

## Reading and synthesizing

### Global understanding

The use of cutting-edge technologies has made the Sanxingdui excavation safe and efficient. Read the passage and complete the outline to better understand the roles of technology in archaeology.



#### Technologies

Archaeological cabins

3) \_\_\_\_\_  
technologies

5) \_\_\_\_\_  
technology

Microscopes and  
spectrometers

Organic and inorganic  
laboratories

High-resolution and  
panoramic cameras

#### Functions

- Protecting the artifacts from extreme 1) \_\_\_\_\_ during excavation
- Effectively extracting and delivering 2) \_\_\_\_\_
- Obtaining the unique 4) \_\_\_\_\_ characteristics of artifacts for substance identification
- Providing crucial data and technical support for further study

Greatly improving the 6) \_\_\_\_\_ and the preservation of artifacts

Helping study 7) \_\_\_\_\_

Ensuring instant 8) \_\_\_\_\_ of materials upon excavation

Making 9) \_\_\_\_\_ expert consultations possible

By strengthening the 10) \_\_\_\_\_ of archaeological excavation, technologies enhance our understanding of Chinese history and culture.



## Detailed understanding

Read the passage again and decide whether the statements are true (T) or false (F).

Then correct the false ones.

- \_\_\_\_\_ 1. The unearthed artifacts in the 1986 Sanxingdui excavation sparked questions about the origins of the Shu culture and Chinese civilization.
- \_\_\_\_\_ 2. The use of a large canopy spanning over 2,000 square meters is a pioneering model for field archaeology.
- \_\_\_\_\_ 3. Archaeological cabins provided physical protection for artifacts during excavation.
- \_\_\_\_\_ 4. The crane in the archaeological cabin can lower archaeologists into the pits and allow them to work suspended in midair.
- \_\_\_\_\_ 5. Spectra function as “fingerprints” for identifying substances in the specialized low-light archaeological hyperspectral imaging scanning system.
- \_\_\_\_\_ 6. Hyperspectral imaging devices utilize spectral features for the precise dating of archaeological artifacts.
- \_\_\_\_\_ 7. The discovery of silk proteins in the remnants of silk products from Pit 4 revealed that ancient Shu was one of the important origins of silk in ancient China.
- \_\_\_\_\_ 8. The safe excavation of the large *zun* vessel from Pit 3 demonstrates the role of hyperspectral imaging technologies.



Bronze Gallery of Sanxingdui Museum in Guanghan, Sichuan Province



# Building your language

## Subject terms

Translate the English expressions into Chinese.

1. LiDAR technique \_\_\_\_\_
2. Ground-Penetrating Radar \_\_\_\_\_
3. high-resolution satellite imagery \_\_\_\_\_
4. archaeological cabin \_\_\_\_\_
5. field archaeology \_\_\_\_\_
6. video microscope \_\_\_\_\_
7. scanning electron microscope \_\_\_\_\_
8. high-resolution network camera \_\_\_\_\_
9. panoramic camera \_\_\_\_\_
10. live video feed \_\_\_\_\_

## Banked cloze

Complete the passage with suitable words from the word bank. You may not use any of the words more than once.

lineage    unfold    relics    adept    discern    spectrum  
extinct    panoramic    empirical    minimize    unearth  
extract    intertwine    enigmatic    illuminate

Digital archaeology is an emerging field that utilizes modern technology to study ancient artifacts and sites. These artifacts, whether they are 1) \_\_\_\_\_ or other remains from the past, often provide a unique window into the lives of previous civilizations. By employing digital tools, archaeologists can create a(n) 2) \_\_\_\_\_ view of historical sites, enabling them to examine every detail with meticulous precision.

A key strength of digital archaeology lies in its ability to help 3) \_\_\_\_\_ and digitally record ancient objects without causing damage. Through non-invasive methods, researchers can 4) \_\_\_\_\_ hidden details that may be invisible to the naked eye and 5) \_\_\_\_\_ aspects of the past that were once shrouded in mystery. For instance, 3D scanning and imaging allow archaeologists to 6) \_\_\_\_\_ detailed information about an artifact's shape, material composition, and even its oxidized surfaces, which can reveal valuable insights into its age and origin.

In this process, digital archaeologists are 7) \_\_\_\_\_ at analyzing complex data and integrating various digital technologies to enhance their research. As physical evidence and digital data become more interwoven, digital archaeology opens up a broader 8) \_\_\_\_\_ of research possibilities. It enables researchers to bridge the gap between the past and the present, creating virtual representations that can be studied long after the original site has been altered or degraded.

By combining traditional methods with cutting-edge digital tools, archaeologists can 9) \_\_\_\_\_ the impact on physical sites, ensuring that future generations have the opportunity to study these artifacts. Through digital reconstructions, we gain a deeper understanding of how different aspects of ancient life 10) \_\_\_\_\_. Therefore, digital archaeology plays a crucial role in preserving our past while providing innovative tools and methods for exploring history.

## Translation

**Translate the paragraph into English.**

考古学有两把手铲（trowel），一把是实际使用的手铲，一把是象征意义的手铲。前者是田野考古发掘的必备工具，后者是分析检测考古遗存潜信息的科技手段。科学技术提供的新手段、新工具应用于考古调查、勘探、发掘和研究，提高了考古工作的发现和分析能力，提升了考古学研究的精度，拓宽了考古学研究的领域。如今，科技考古已列为考古学的二级学科（subdiscipline），其目标是还原（reconstruct）古代人类的生活及其社会状况，解析人类文化与社会发展历程，探索社会变化的背景、原因与规律。



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# Telling China's stories

## Presenting China's archaeological contributions

*China, along with the rest of the world, is using new technologies to advance archaeological excavation. As outlined in the scenario, you will be presenting China's contributions to world archaeology at the forum themed "Technological Advances in Archaeology." The following steps will guide you through the task.*

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### Step 1 Brainstorming

Form groups of four or five and answer the following questions:

1. What are the most urgent challenges in archaeology, including those in China?
2. What new technologies have been used in China to deal with these challenges?
3. How do China's solutions for these challenges contribute to world archaeology?

### Step 2 Doing research

Assign roles to conduct research based on the above questions. Gather relevant information, data, or statistics from credible sources (e.g. UNESCO reports, academic journals). Summarize your findings clearly and concisely, focusing on key points that align with the forum's theme.



Archaeological Ruins of Liangzhu City in Hangzhou, Zhejiang Province

### **Step 3** **Selecting key points**

Hold a group discussion to synthesize and select the most compelling and relevant information to include in your presentation. Since your target audience may not be familiar with Chinese history, culture, or archaeological context, providing some necessary background information can ensure your content resonates with an international audience.

#### **Tips for cross-cultural awareness**

- **Introduce geographical context:** Describe the location and historical importance of the archaeological sites. For example, Liangzhu, in the Yangtze River Delta, provides crucial evidence for China's 5,000-year-old civilization.
- **Provide historical background:** Briefly explain the historical period of the discoveries and their global significance. For example, Sanxingdui, from the Bronze Age, parallels ancient Egyptian and Mesopotamian civilizations.
- **Explain cultural symbols:** Highlight the meaning behind the artifacts. For instance, bronze patterns like the *taotie* motif reflect ancient religious beliefs and social hierarchies.

### **Step 4** **Outlining and drafting**

Organize the information into a clear and logical outline. Write the full presentation script based on your outline and design slides that are visually appealing and culturally inclusive.

### **Step 5** **Presenting and evaluating**

Deliver your presentation as a team, supporting each other during the Q&A session and addressing questions with confidence and respect. When your classmates finish their presentations, you can give your feedback (e.g. content, structure, logic, and language). You can also comment on their delivery (e.g. audience awareness, eye contact, tone & intonation, or whatever impresses you most).



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