

EDUCATOR'S GUIDE

MUMMIES



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ESSENTIAL QUESTIONS

What is mummification?

When a living thing dies, natural processes lead to its **decay** or decomposition. But in some conditions, such as a very dry environment, a human or other animal body is preserved in a process called **mummification**.

While this process happens naturally, thousands of years ago people began to deliberately mummify their dead: they stopped the natural process of decay to preserve the remains. A mummy is flesh and bones, and sometimes wrappings and precious objects.

The earliest human mummy discovered so far dates from 7400 BC in Spirit Cave, Nevada. Many ancient cultures created mummies, but the practice is oldest and most widespread in Egypt and South America, especially Peru.

Why mummify?

Mummification was practiced in every continent except Antarctica. Each culture had its own reason for preserving their dead.

In ancient Peru, mummification allowed the living to remain connected with their ancestors. The earliest mummies, dating back to 5000 BC, are thought to have been prepared by close family members. Some people kept mummies in their homes. Others kept them in graves and visited them to change their wrappings and to bring offerings of food and drink. In later societies, community members sometimes displayed their mummified ancestors at celebrations and festivals.



Vessels for corn beer were buried with mummies in the ancient Chancay culture of Peru.

In Egypt, the oldest mummies found are dated from 3500 BC. These were preserved naturally, when bodies were buried under hot, dry sand. Inspired by this natural mummification, Egyptians developed a more intentional, elaborate process. Egyptians **embalmed** their dead to prepare them for the afterlife. They also buried mummies with essential goods they would need in the next world. These objects reflected the person's wealth and status.

What do scientists learn from mummies?

Mummification provides an extraordinary window into the lives and cultures of people who lived long ago. Every mummy tells a story. Each component—the body, the wrappings, and all of the objects associated with it—provides clues about the person's age, health, livelihood, and death. Mummies also reveal a lot about ancient beliefs. Scientists can reconstruct a person's culture by looking at the things their community buried with them.

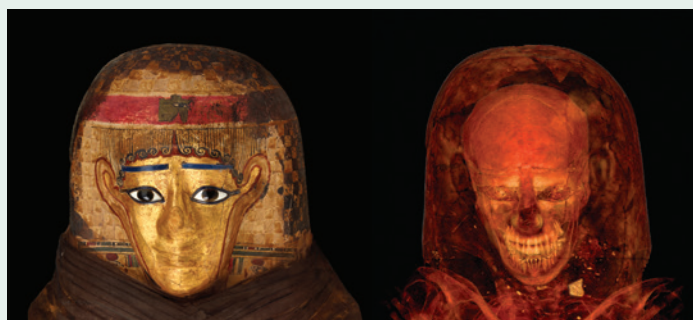
In Peru, mummies were often bundled with artifacts linked with their work and gender. For example, in some societies, women might have been buried with weaving tools, and men with fishing nets.

Egyptian mummies were buried with objects needed for the afterlife, from food to precious gold. These artifacts give scientists clues about the social and economic standing of people who died. Tombs holding extravagant goods and hundreds of expensive ceramic figurines representing servants belonged to the wealthy. And scientists know that people buried within pyramids were the most wealthy and powerful.

How do scientists study mummies?

In the past, the only way to learn about a mummy was to unwrap it. But this widespread practice destroyed the mummy, often detaching body parts. Today, new technologies give **archaeologists**, as well as other scientists, less destructive, non-invasive, and respectful ways to examine mummies. Some of these modern tools include:

- ♦ **Computerized tomography** (or CT) scanners allow scientists to see inside a mummy without unwrapping it. Scientists analyze **CT scans**—3D images—to determine the person's age, gender, and condition of the bones.
- ♦ **Isotopic testing** provides a chemical analysis of the mummy's remains, such as bones, tissue, and even hair. **Biologists** use this method to learn about the person's health and diet. They can also identify diseases and learn about epidemics of the past.
- ♦ **DNA analysis** of the mummy's body allows **geneticists** to investigate the person's family relationships, ancestry, and connection to modern populations. This method allows scientists to study genes of ancient plants and animals.
- ♦ **Digital visualization** and 3D printing allow scientists to reconstruct faces of those long dead, or precious objects buried with them. These tools use CT scans and other forensic research to produce lifelike representations of ancient people and things.



Through thousands of cross-section images, CT scanning reveals that this mummy was a woman in her forties with curly hair and a slight overbite. She may have died from tuberculosis, a common ailment in ancient Egypt.

MAP OF THE EXHIBITION

In this exhibition, you and your students will come face-to-face with real mummies, remains of humans and other animals that have been preserved for thousands of years. You'll encounter mummies from the ancient cultures of Peru and Egypt.

Use these guided explorations to investigate two main themes of the exhibition: (1) **people and cultures**—what mummies reveal about families, social status, and community; and (2) **technology**—the ancient methods of mummification and the modern techniques of studying mummies.

1. HOW WE DISCOVER

1a. An unwrapped mummy

1b. CT scanner

1c. Timeline

2. PERU

2a. Map, stone tools, clay mask

2b. Interactive

2c. Mummy bundles, figurines, CT scans

2d. Pit burial diorama

2e. Mummy bundle, burial objects

2f. Animation

3. PERU vs. EGYPT

4. EGYPT

4a. Mummy, organ packets, canopic jars, embalming tools

4b. Predynastic mummy, interactive, pots

4c. Tomb diorama, stone sarcophagus, burial goods, mummified animals

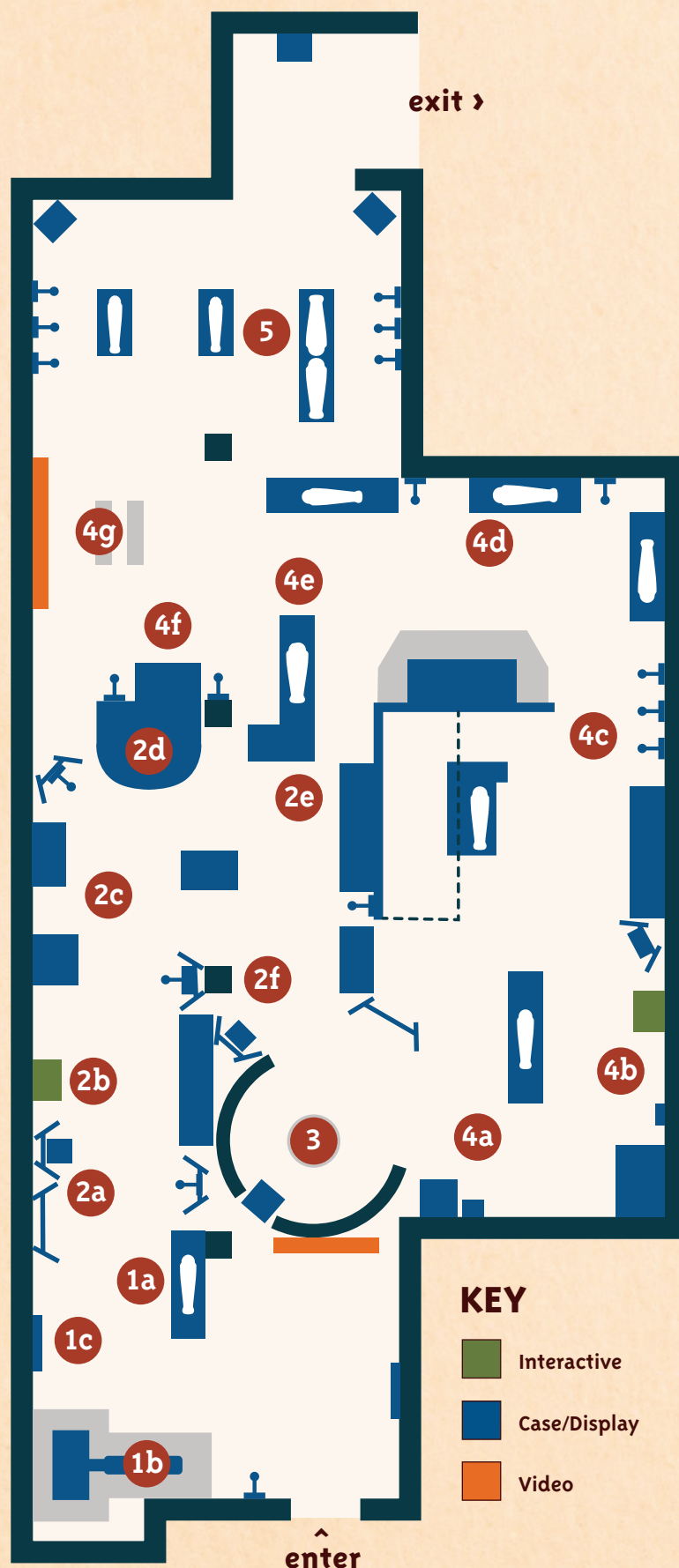
4d. Wood coffins, mummy wrapped in linen

4e. Coffin lid

4f. Mummified heads, necklace, comb

4g. Video

5. PORTRAITS



TEACHING IN THE EXHIBITION

1. HOW WE DISCOVER

This section focuses on the evolving methods scientists use to study mummies. As students explore these stops, have them note the techniques used to examine mummies and what scientists can learn from each one.

1a. An unwrapped mummy: A century ago, the only way to look inside a mummy was to unwrap it. Often, this destroyed the body. When the face covering of this Egyptian mummy was torn off, the head was detached.

1b. CT scanner: Today, scientists have new tools like computerized tomography (CT) to look inside a mummy without damaging it.

1c. Timeline: Imaging techniques have changed over time. From early lithographs to photographs to x-rays to modern CT scans, each new tool has revealed more information about mummies.

2. PERU

In ancient Peru, people began to mummify their dead around 5000 BC. Dozens of Peruvian societies practiced mummification over thousands of years. This practice allowed the living to remember, honor, and stay connected with the dead. Families sometimes kept mummies in their homes, brought them to festivals, or delivered food and drink to their graves.

As students explore the mummies, artifacts, and CT scans in this section, ask them to consider how and why different Peruvian societies mummified their dead, and how their methods changed over time.

2a. Map, stone tools, clay mask: The ancient Chinchorro peoples (5000 to 2000 BC) of coastal Chile and Peru used stone tools to prepare the body for mummification. Each mummy was adorned with a wig and a mask. The fragile clay mask on display was recreated by an artist using ancient materials and methods.

2b. Interactive: Students can rotate and virtually “unwrap” three mummies to investigate the body and artifacts within. They’ll discover the person inside was not always alone—and was not always an adult.



Replica of a Chinchorro mummy mask. The Chinchorro people were the world’s first practitioners of deliberate mummification, thousands of years before Egyptians.

2c. Mummy bundles, figurines, CT scans: These mummy bundles were from the Chancay people (AD 1000 to 1400), who lived in the desert near the Pacific Coast. Like other Peruvian cultures at the time, they relied on the climate to dry and preserve the body. They showed their respect for the dead by carefully preparing and wrapping the body, sometimes placing small objects inside. To portray the person within, they may have added a false head, clothes, and accessories to the outside of the bundle. CT scans reveal the skeletons and objects within the mummy bundles.



A thousand years ago in the Chancay culture of Peru, this *cuchimilco* (guardian figure) was buried with the mummified remains of a loved one, along with food and everyday objects.

2d. Pit burial diorama: An underground pit like this would have held generations of ancestors, surrounded by pots, food, and other offerings. These burial pits give us important clues about the community that made them.

2e. Mummy bundle, burial objects: Scientists look closely at objects buried with a mummy to learn about the person’s life and culture. A Chancay woman wrapped in homemade fabric with looms and weaving tools may have been a master weaver. A Nazca (AD 0 to 600) man buried with a sling that was used for protecting livestock may have been a herder. Mummies were also buried with offerings of food and drink—such as pots of corn beer and dishes piled with corn and fish—showing how communities cared for the dead, long after burial.

2f. Animation: In many Peruvian communities, people brought mummies out from their tombs to involve them in celebrations. Items found in graves give us clues about important rituals like these. Many graves included items used during festivals or funerals, such as musical instruments.

3. PERU vs. EGYPT

Though ancient Egyptians and Peruvians both practiced mummification, these cultures never interacted. In this short section, ask students to compare and contrast how, why, and when these cultures created mummies.



4. EGYPT

Ancient Egyptians believed that their ancestors could live on in the next world, but that a person's body needed to be preserved to continue on to the afterlife. Around 3500 BC, Egyptians started mummifying the dead. In this section, students can examine real mummies and artifacts, as well as CT scans, to discover how and why ancient Egyptians created mummies, and how the process evolved over time.

4a. Mummy, organ packets, canopic jars, embalming tools: Egyptians practiced mummification for thousands of years. Over this time, mummification evolved into an elaborate process. Some organs were removed and embalmed separately in canopic jars. Egyptians believed certain vital organs would be essential for the afterlife.

4b. Predynastic mummy, interactive, pots: The first mummies in Egypt were not preserved through embalming, but naturally, by the environment. Bodies were preserved in the hot, dry sand, which may have given Egyptians the idea for deliberate mummification. These first mummies were buried in simple pit graves with pots and other offerings. Ancient Egyptians buried these pieces to show reverence for the dead, but they also believed they would be needed in the next world. Students can virtually "unwrap" four mummies, and see the teeth, fractured bones, canopic jars, or figurines inside each one.

4c. Tomb diorama, stone sarcophagus, burial goods, mummified animals: By the time of the 26th Dynasty (664 to 525 BC), people with rank or wealth had tombs like this one constructed based on millennia-old designs that guarded against grave robbers. A powerful person might also be buried in a sarcophagus, or large stone coffin, for added protection. These tombs held all the goods desired or needed for the afterlife, including servants, food, and records of name and status. Alongside humans were many animal mummies, some buried as pets, others as offerings to the gods.

4d. Wood coffins, mummy wrapped in linen: Before being placed in a wood coffin, embalmers meticulously wrapped the body in linen. Wood was scarce, and highly valued, in ancient Egypt. Only high-ranking officials could afford imported wood. Coffins for others were made with patches of thin wood from native trees. Egyptian coffins were often customized with painted hieroglyphs.



The upper band of this wood coffin shows the god Thoth holding the hand of the just deceased man, and introducing him to Osiris, god of the underworld. In the lower band, the man is being embalmed by the jackal-headed god Anubis.

4e. Coffin lid: Rome conquered Egypt in 30 BC, influencing the imagery and style of tombs and burial objects. On this coffin lid from around AD 250, there are no hieroglyphs and the painted image of the woman's clothes and hairstyle look more Roman than Egyptian. A few centuries later, the art of mummification in Egypt was lost altogether.

4f. Mummified heads, necklace, comb: Grave robbers sometimes tore mummies apart looking for jewelry and other precious objects, discarding remains and less valuable objects. These items still have scientific value: they can show what life was like for ancient Egyptians.

4g. Video: Egyptians believed in the afterlife, but not that it was guaranteed. Mummifying the body was just one step. Loved ones provided prayers and spells, left offerings to the gods, delivered goods for the next world, and decorated coffins and sarcophagi. All of these acts allowed the spirit to live on.

5. PORTRAITS

With the help of modern technology, scientists and artists can create portraits of those long dead without ever unwrapping the mummified remains. Scientists use CT scans to produce a digital recreation of the skull. Next, they create a replica with 3D printing. Finally, artists add layers of clay for facial muscles, and choose a skin tone based on forensic research.



Top row: coffin exterior, 3D imaging. Bottom row: CT scan, clay reconstruction, completed sculpture of teenager

COME PREPARED CHECKLIST

- Plan your visit.** For information about reservations, transportation, and lunchrooms, visit amnh.org/fieldtrips
- Read the Essential Questions** to see how themes in the exhibition connect to your curriculum.
- Review the Teaching in the Exhibition section** for an advance look at what your class will encounter.
- Download activities and student worksheets** at amnh.org/mummies-for-educators. They are designed for use before, during, and after your visit.
- Decide how your class will explore the exhibition:**
 - You and your chaperones can facilitate the visit using the Teaching in the Exhibition section.
 - Students can use the worksheets and/or maps to explore the exhibition on their own or in small groups.

CORRELATION TO STANDARDS

A Framework for K-12 Science Education

Disciplinary Core Ideas • ETS2: Links Among Engineering, Technology, Science, and Society

National Curriculum Standards for Social Studies

Standard 1: Culture

Standard 2: Time, Continuity, and Change

Standard 3: People, Places, and Environments

Classroom and Museum visit activities, available online at amnh.org/mummies-for-educators, are correlated to New York State Social Studies Standards.

CREDITS

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GLOSSARY

- archaeologist:** a scientist who studies past cultures through materials left behind
- biologist:** a scientist who studies living things
- CT Scan:** a three-dimensional image made by combining hundreds of x-ray images taken from different angles
- DNA:** a molecule found in the cells of every living thing that carries the organism's genetic information
- decay:** to rot, decompose, or break down over time; the breakdown of organic tissue caused by bacteria and fungi
- embalm:** to chemically preserve a body to keep it from decaying
- geneticist:** a scientist who studies how traits of people and other living things are inherited through DNA
- lithograph:** an image made by applying a substance that attracts or rejects ink to a smooth surface (like stone or metal)
- mummification:** the process of preserving and wrapping a body for burial
- sarcophagus:** a large stone coffin designed to hold and protect a wooden coffin and human remains
- x-ray:** an image produced by passing high-energy electromagnetic radiation through an object



Fragment of an Egyptian sarcophagus. The entire limestone sarcophagus would have weighed several thousand pounds.

PHOTO CREDITS

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