



WRITTEN IN  
BONE

**FORENSIC FILES OF THE 17TH-CENTURY CHESAPEAKE**  
EDUCATOR'S MANUAL



Smithsonian  
*National Museum of Natural History*



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HISTORY™

# Teach your students to read the stories written in bone.

## All New Forensic Anthropology Lab

The **Smithsonian's National Museum of Natural History** is proud to announce the opening of a new Forensic Anthropology Lab. The all new Forensic Lab offers hands-on activities connected with the **Written in Bone** exhibition.

In the Forensic Anthropology Lab, your students will use the tools of forensic anthropologists as well as their own problem-solving skills to investigate forensic cases using real bones. They will use real human bones to identify and describe the gender and status of people from the past and present and draw conclusions about their lives. They will also explore the use of objects, insects, and other natural and man-made artifacts in forensic science and will solve mysteries through investigation.

**Get hands-on with science today.**  
Visit [www.mnh.si.edu/education/fieldtrip](http://www.mnh.si.edu/education/fieldtrip).  
Forensic programs require reservations for school groups and are for Grades 4–12.



Smithsonian  
National Museum of Natural History

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The Smithsonian's *Written in Bone* exhibition captured my imagination from the moment I first heard about it, when it was still in the planning stages. Forensic anthropologists decode the cryptic messages of skeletal remains from early America. They employ the latest technology to uncover details of everyday life, details inaccessible through traditional documentary sources. Their discoveries provide new insights on topics ranging from birth to death in the 17th-century Chesapeake. Sometimes it's grisly, but it's always authentic. What's not to love? As an educator, I think the work of Doug Owsley and his team is an ideal way to reach today's young people, with this seamless combination of science and history. It's CSI meets colonial America, giving the past a new voice through modern technology. And as a historian, I am delighted that the National Museum of Natural History is presenting the remarkable evidence about the individual experience in colonial America through an exciting and accessible new exhibition for visitors of all ages to enjoy.

**HISTORY™** has worked with the experts at the Smithsonian to create the on-site short films that accompany the manual. We also collaborated on this educator's manual to enrich the learning experience for teachers and parents. Whether you teach in the classroom, after school, or at home, we hope you find it a useful place to start your exploration of a past that is truly "Written in Bone."

Libby H. O'Connell, Ph.D.  
Chief Historian, Senior Vice President, Corporate Outreach  
A&E Television Networks

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The content of this educator's manual was adapted from the exhibition *Written in Bone: Forensic Files of the 17th-Century Chesapeake* on view at the Smithsonian's National Museum of American History February 7, 2009 - February 6, 2011.

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# WRITTEN IN BONE



## FORENSIC FILES OF THE 17TH-CENTURY CHESAPEAKE

How do we uncover new evidence about the past? Is it possible to envision more clearly the contours of the human experience, stretching back hundreds of years? While many students may be familiar with the wide variety of sources anthropologists and historians use to retrace the past, this educator's manual introduces a source few of us may have considered: the human skeleton. The Smithsonian's National Museum of Natural History has launched an exciting new exhibition entitled *Written in Bone: Forensic Files of the 17th-Century Chesapeake*. Using the tools of forensic anthropology, this exhibition explores the way bones can be examined to reveal new insights into human life and habits in the 17th century.

Smithsonian forensic anthropologist Kari Bruwelheide examining the skeleton of a 6-month-old infant with severe rickets. Date of death ca. 1683. Historic St. Mary's City. Photo: Chip Clark, Smithsonian Institution

## INTRODUCTION

Based on research conducted by Doug Owsley and his team of forensic anthropologists at the Smithsonian's National Museum of Natural History, this exhibition highlights what these experts have learned from analyzing several skeletons unearthed in the Chesapeake area dating back to the 17th century. Owsley and his team treat each new skeleton as a time capsule that can speak volumes for the peoples and communities that can no longer speak for themselves. This educator's manual is intended as a companion to the *Written in Bone* exhibition. Educators are encouraged to use the activities and background information in this manual for additional classroom curriculum links before and after visiting the museum. For those unable to visit the exhibition in person, this manual can be used as an informative introduction to the field of forensic anthropology with a special focus on the history of the Chesapeake colonies.

An introductory section of this manual provides a framework for the key concepts and themes explored in the *Written in Bone* exhibition. Activities based upon grade level will allow teachers to connect these concepts with a variety of curriculum areas including geography, history, social studies, and science and technology. The exhibition and manual also introduce students to the many exciting applications of forensic anthropology and related fields, allowing students to consider the ways new research tools have relevance to their everyday lives and possible career choices.

## BONE BIOGRAPHIES

*Written in Bone: Forensic Files of the 17th-Century Chesapeake* focuses on the ways forensic anthropologists examine skeletons to learn about history. One skeleton can reveal the life story of a person – and many skeletons can help tell the story of a group of people. These tales can be recent or hundreds of years old. We can think of bones as skeleton keys, and these keys can help unlock stories from the past.

A scientist who uses the “keys” in human bones and teeth is a forensic anthropologist. The word forensic refers to the application of science to legal or criminal matters, but forensic anthropologists can investigate both modern and ancient skeletons and remains to solve mysteries.

Every skeleton holds a unique human history. Even before birth, a skeleton is building a “bone biography.” The living tissue of bone records “life data” as a person grows, lives, and dies. Bones and teeth often withstand decay, so the data may survive long after death. Sometimes skeletal evidence is the best way to learn about a once-living person.

The guide below provides a framework for understanding what information students can learn by analyzing bone and compiling “bone biographies.” By learning more about how to examine skeletons, students will be introduced to an exciting new way of learning about the past, and will be able to explore the relevance of forensics in our contemporary world.

## ALL ABOUT BONES

- An adult human has 206 bones, but a child has more – about 300 bone “parts.”
- Bone is living tissue made up of cells within a matrix of protein (mostly collagen) and minerals (mainly calcium and phosphorus).



African female skeleton partially exposed in the remains of a hexagonally shaped wooden coffin, dated to the first half of the 18th century. Burial 7, Harleigh Knoll site in Talbot County, MD. Photo: Chip Clark, Smithsonian Institution

Bone has three essential layers:

1. **Compact surface bone** (provides strength and protection)
2. **Spongy porous bone** (provides strength)
3. **Marrow** (makes red blood cells and white blood cells, and stores and releases fat)

Almost all cells, including bone cells, contain DNA – the chemical codes of our genes. Our individual set of genes guides the production of enzymes, which in turn control cells, which form tissues, which make every one of us a unique living organism.

Bone retains information such as sex and ancestry that is found in our DNA. Although DNA evidence can be damaged due to decay and weather, bones can still retain a tremendous amount of information. By analyzing bones, forensic anthropologists can determine the following information about a person from the past:

<b>age</b>	<b>diet</b>	<b>illness</b>
<b>ancestry</b>	<b>height</b>	<b>sex</b>
<b>cause of death</b>	<b>injury</b>	

The biological profile of every skeleton is unique. In a forensic or archaeological investigation, a bone biography, along with evidence at the scene of the excavation or crime, can answer many questions about an unidentified person. Even after fingerprints and facial features are gone or unrecognizable, skeletal evidence can help us answer the following questions: Who was this? What did he or she look like? What did they do? How did they die? ☠



Life-size sculpted figure by StudioEIS based on a facial reconstruction by forensic artist Joanna Hughes; the boy found at the Leavy Neck site, Anne Arundel County, Photo: Chip Clark, Smithsonian Institution

## A TALE OF TWO COLONIES

The *Written in Bone* exhibition focuses on excavations at two key 17th-century settlements: Jamestown, Virginia and St. Mary's City, Maryland. These remarkable excavations have produced a volume of artifacts dating back to the formation of these early colonies. In the decades after 1607 when the first European settlers arrived in Jamestown, shipload after shipload of colonists sought new lives in North America. Some of these settlers were explorers in search of riches and new land, others were common people seeking religious freedom, and others were indentured servants thrust into the New World out of force and necessity. As settlers continued to arrive, they moved inland and set up forts along the coastal rivers of Virginia and Maryland.

While historians and anthropologists have parsed written sources for insights into life in the colonies, some of the most detailed and intimate sources have not been analyzed until recently. Transformations in technology and a new understanding of bone evidence have allowed forensic anthropologists to unearth, literally, a wealth of new information about daily life in the colonies. These examinations have shed light on interactions between European settlers and their new environment, including their interactions with Native populations of the Chesapeake, and have contributed new information about the lives of Africans in the Chesapeake after their arrival in 1619. The background content below will help provide a context for exploring the themes and findings covered in the *Written in Bone* exhibition.

### JAMESTOWN

Four centuries ago, a band of just over 100 English adventurers arrived on the shores of the James River of the Chesapeake Bay and established a settlement known as Jamestown. The charter for the colony had been granted by King James I of England, who hoped the settlers would establish profitable trade relationships and find a route to the Pacific Ocean. When they arrived in May of 1607, the settlers built a fort. From 1607 until 1698, Jamestown (also referred to as James Forte or James Cittie) served as the capital of the Virginia Colony.

The first several years of settlement in Virginia were extremely difficult – as many as one third of the English died within a year of arrival. Led by Captain John Smith, the settlers faced harsh conditions, food shortages, and difficult negotiations with the Powhatan Indians. Relations between the English and the Powhatan tribe were mixed; at times they traded peacefully, and at other times their interactions turned violent. In 1609, relations reached a breaking point when Chief Powhatan tried to undermine the power of the colonists by ending their trade relationship just as new shiploads of settlers arrived in Virginia. This period, known as the “Starving Time,” led to extreme hunger and high rates of mortality among the settlers.

Despite the enormous difficulties they faced, the colonists managed to prevail and Jamestown survived. Improved relations with the Powhatan Indians emerged with the union of English leader John Rolfe and Pocahontas, the daughter of Chief Powhatan. Rolfe also introduced tobacco to Jamestown, providing a lucrative new crop. In 1619, the first Africans arrived at Jamestown, and within a few decades a system of enforced labor based on race was established.

As the Jamestown settlement grew, the old fort was abandoned and a larger town developed. In the past decade, archaeological excavations at this site have unearthed much of the 17th-century town, with hundreds of artifacts that help reveal what everyday life was like in Jamestown. This manual focuses on the insights anthropologists and historians have gained from analyzing one category of evidence uncovered at the site: bones.

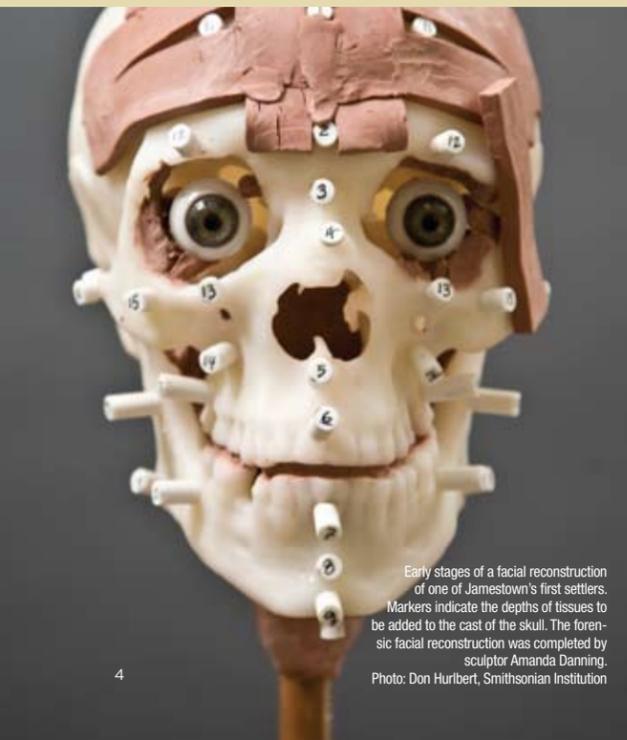
### ST. MARY'S CITY

In 1634, another English colony was founded in the northern Chesapeake. Though there were many similarities between the Maryland colony and Jamestown, there were some notable differences. George Calvert was the Secretary of State for King James I during a period of intense conflict between Protestant England and Catholic Spain. Calvert, a Catholic, was held in high esteem by the King, and his family was granted land in the Chesapeake; his son, Cecil Calvert, inherited the charter to the colony. While the majority of investors in the colony were Catholic, most of the workers tasked with building the colony were Protestant. In order to avoid conflict, the settlement – named St. Mary's City – was founded as non-denominational in a spirit of religious tolerance.

Though there were challenges in Maryland as in Virginia, St. Mary's City slowly prospered. Tobacco became a key crop in the Chesapeake during the second half of the 17th century and new settlers arriving in

Maryland advanced socially and economically. Indentured servants and slaves were used as inexpensive laborers to cultivate crops and construct buildings. Interactions with Native American groups, much like in Jamestown, veered between peaceful coexistence and spouts of violence.

In 1688, King James II was overthrown by a revolution in England. The Calverts' charter had ended – Maryland became a royal colony and the capital was moved to Annapolis in 1695. St. Mary's City was abandoned and turned into farmland. The rural terrain on which the colony was established helped preserve the remains of the settlement under a thin layer of plowed soil. This area remained sparsely populated for generations, providing good conditions for the preservation of artifacts buried underground. A series of excavations has yielded fascinating new insights into everyday life in the colony. Among the most important findings at Historic St. Mary's City are the graves and the skeletons within them, which speak for the colonists who can no longer speak for themselves. ☠



Early stages of a facial reconstruction of one of Jamestown's first settlers. Markers indicate the depths of tissues to be added to the cast of the skull. The forensic facial reconstruction was completed by sculptor Amanda Danning. Photo: Don Hurlbert, Smithsonian Institution



Archaeologist Ruth Mitchell excavating a 17th-century grave located inside the partially reconstructed Brick Chapel at Historic St. Mary's City. Photo: Chip Clark, Smithsonian Institution

## ACTIVITIES GRADES 5-6

The activities in this manual are intended to be creative suggestions for teachers looking for ways to implement the concepts and content explored in the *Written in Bone* exhibition in their classrooms. Some of these activities can be pursued before visiting the exhibition, and others will work most effectively after students have visited the exhibit or explored the themes it covers through other classroom course units. For teachers and students unable to visit the exhibition in person, these activities can be adapted to fit relevant course units. Teachers are also encouraged to visit the Smithsonian's National Museum of Natural History online to view companion materials associated with the exhibition: [www.mnh.si.edu/education/exhibitions/writteninbone](http://www.mnh.si.edu/education/exhibitions/writteninbone)

### VOCABULARY

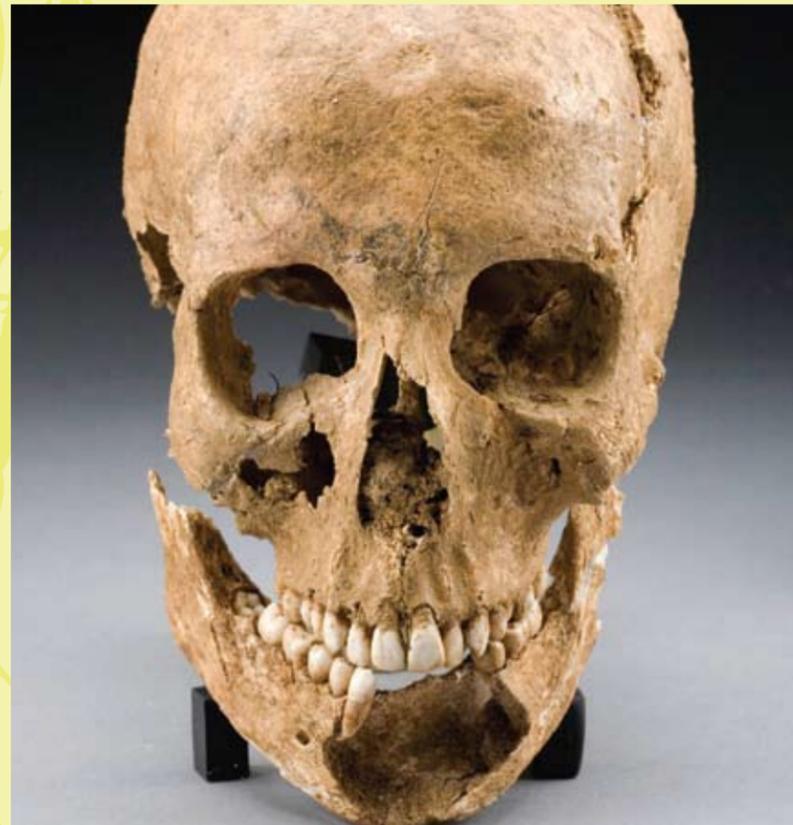
Using the dictionary at [www.merriamwebster.com](http://www.merriamwebster.com), an Internet resource such as [www.History.com](http://www.History.com), or an encyclopedia, students should define or explain the significance of the following terms:

**anthropology**   **colony**   **excavate**   **osteology**  
**artifact**   **DNA**   **forensic**   **preservation**

### COMPREHENSION QUESTIONS

The questions below can be presented to students for the purpose of classroom discussion, for a short written response, or as critical thinking questions to consider before or after viewing the exhibition.

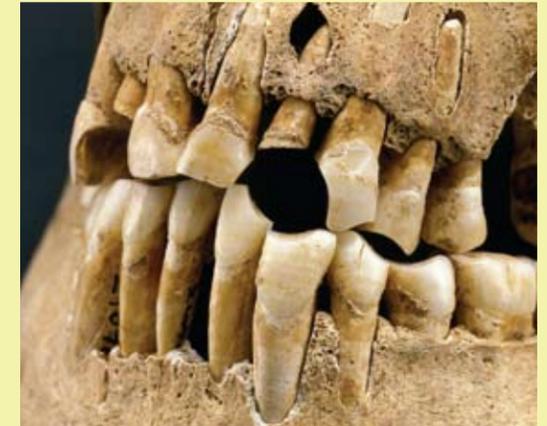
1. The *Written in Bone* exhibition focuses on life in the 17th century. What do you know about this time period? What is the source of your information?
2. What are some of the things we can learn from studying skeletons from the past? Where else can we get this information?
3. Why do you think it is important for anthropologists to be very careful when they are doing excavations?
4. What is DNA, and what can we learn from studying it?
5. The *Written in Bone* exhibition reveals many new findings about life in the 17th-century Chesapeake. Why do you think it is important to study this time period?



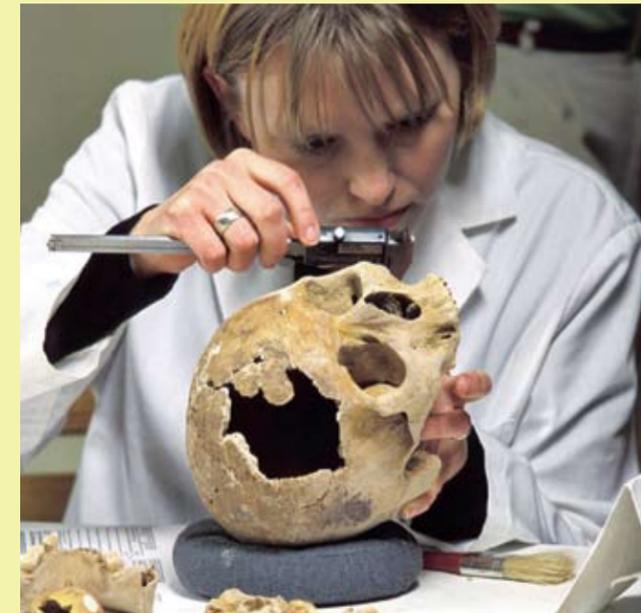
Skull of a European male 14 to 15 years old, 1607, James Fort site, Jamestown, VA. Photo: Chip Clark, Smithsonian Institution



Forensic anthropologist Doug Owsley (left) and APVA Preservation Virginia/ Historic Jamestown archaeologist (Danny Schmidt) discussing the double burial of two European males. James Fort site, 1607. Photo: Chip Clark, Smithsonian Institution



Clenching a clay pipe in the mouth wore a hole into this man's teeth. Patuxent Point site, Calvert County, MD, ca. 1660-1680. Photo: Chip Clark, Smithsonian Institution



Smithsonian Institution forensic anthropologist Kari Bruwelheide measuring a cranium. Spain forensic investigation. Photo: Chip Clark, Smithsonian Institution

### ACTIVITIES

1. **Bone Biography:** A "bone biography" tells the story of a person from the past through an analysis of their bones and skeletal structure. It includes information about who they were, how they lived, and possibly reveals how they died. Ask students to create their own bone biographies of one of the individuals explored in the exhibition. Details to include, if possible, are: Identity (Where was he/she from), Age, Gender, Cause of Death, and Occupation. If students don't have all of the details they need, they can make hypotheses based on the evidence found from the bones or based on what they have learned through research.
2. **Artifacts Uncovered:** By analyzing artifacts from the 17th century, we can learn an enormous amount about how people lived and interacted during that time period. Ask students to create a list of artifacts unearthed in Jamestown and St. Mary's City and write 1-2 sentences about what these artifacts can tell us about life in the 17th-century Chesapeake.
3. **A Day in the Life of the Chesapeake:** The *Written in Bone* exhibition sheds light on numerous individuals who lived during the 17th century. Ask students to imagine they were alive during this time period and lived in Jamestown or St. Mary's City. Have them write short diary or journal entries about what daily life was like from the perspective of one individual. Students should be sure to provide details about their identity in their writing.
4. **Cracking the Case:** In order to determine information about an individual by analyzing their graves and bones, forensic anthropologists must take into account many different types of clues to help them unlock the story of who the person was and how they may have died.

Ask students to choose one or more of the following scenarios and write a short paper about what this information could reveal about the person from the past.

- a) Multiple skeletons are discovered in a single grave. What might this reveal about the circumstances under which these individuals died?
- b) Forensic analysis shows that an individual had advanced stages of tooth decay. Given this information, what might you conclude about the individual's background and social status?
- c) Analysis of a skeleton reveals notches or grooves in the front teeth. What might this clue reveal about the identity of the individual?

After providing answers to these clues, ask students to brainstorm and discuss additional clues that may reveal insights into individual and group life in the 17th-century Chesapeake. 🦴

## ACTIVITIES GRADES 7-8

The activities in this manual are intended to be creative suggestions for teachers looking for ways to implement the concepts and content explored in the *Written in Bone* exhibition in their classrooms. Some of these activities can be pursued before visiting the exhibition, and others will work most effectively after students have visited the exhibit or explored the themes it covers through other classroom course units. For teachers and students unable to visit the exhibition in person, these activities can be adapted to fit relevant course units. Teachers are also encouraged to visit the Smithsonian's National Museum of Natural History online to view companion materials associated with the exhibition: [www.mnh.si.edu/education/exhibitions/writteninbone](http://www.mnh.si.edu/education/exhibitions/writteninbone)

### VOCABULARY

Using the dictionary at [www.merriamwebster.com](http://www.merriamwebster.com), an Internet resource such as [www.History.com](http://www.History.com), or an encyclopedia, students should define or explain the significance of the following terms:

ancestry	cranium	forensic	preservation
carbon isotope	DNA	indentured servant	radiocarbon
colony	excavate	osteology	radiograph

### COMPREHENSION QUESTIONS

The questions below can be presented to students for the purpose of classroom discussion, for a short written response, or as critical thinking questions to consider before or after viewing the exhibition.

1. What can forensic anthropologists learn by analyzing bones that we cannot learn from other kinds of historical sources?
2. Many of the 17th-century graves unearthed in the Chesapeake reveal clues into how and why someone died. If a grave or coffin was clearly too small for the individual who was buried within, what might that reveal about the circumstances under which they had died?
3. Forensic anthropologists closely examine the DNA evidence from bones and other artifacts to learn more about how people lived in the 17th century. What are the various methods and tools forensic anthropologists use to examine and collect information from bones?
4. What does this exhibition reveal about the lives of Africans in the 17th-century Chesapeake? What are some of the ways forensic anthropologists determine the ancestry of the people whose bones they discover?
5. Life in the 17th-century Chesapeake was extremely difficult and mortality rates were very high. What are some of the insights we can draw about the challenges they faced from examining their bones?
6. How would a forensic anthropologist determine whether a skeleton was buried 400 years ago or four years ago?



William White autopsy - Physical anthropologists Doug Owsley and Kari Bruwelheide examine a rare cast iron coffin found on a construction site. They learned the man inside died in the mid-19th century and due to the airtight seal on the coffin, his body was amazingly well preserved. Photo: Chip Clark, Smithsonian Institution



Hip replacement (prosthesis). The damaged ball of the femur was replaced by a metal implant. The William M. Bass Donated Skeletal Collection, University of Tennessee. Photo: Chip Clark, Smithsonian Institution

### ACTIVITIES

1. **Bone Biography:** A "bone biography" tells the story of a person from the past by analyzing their bones and burial. It includes information about who they were, how they lived, and possibly reveals how they died. Ask students to create their own bone biographies of one of the individuals explored in the exhibition. Details to include, if possible are: Identity (Where was he/she from), Age, Gender, Cause of Death, and Occupation. If students don't have all of the details they need, they can make hypotheses based on the evidence found from the bones, or based on what they have learned through research.
2. **Brushing Teeth Across Time:** This exhibition speaks volumes about daily life in the 17th century, including the effect of diet on teeth and bones. Ask students to review the ways colonists brushed their teeth in the 17th century and write a short essay about the materials they used, how they obtained them, and the foods they ate. Then, students can compare and contrast these methods of brushing teeth with those of today. Students may also choose to write essays comparing and contrasting some aspects of health care today with that of the 17th century. Lead poisoning, the treatment of broken bones, and the ramifications of rickets are a few examples. This activity will help students gain insights into daily life and practices in the 17th-century Chesapeake.

**3. Forensics Defined:** This exhibition introduces many new terms and concepts which might be new to students. Some of these terms are included in this guide, and students will find many more as they explore the exhibition online or in person. Working in small groups, ask students to create an illustrated glossary of terms related to the exhibition and the field of forensic anthropology. These glossaries can be in PowerPoint format, in notebooks, or on poster-board. Students can illustrate these projects with images or drawings related to the field of forensic anthropology.

**4. An Old World Meets New:** Colonists in Jamestown and in St. Mary's City encountered Native Americans upon their arrival in the Chesapeake. Ask students to imagine they were present during this time period. Then, ask them to write a diary or journal entry about a meeting or encounter between these two groups. Students should use information they learned from visiting the exhibition or from their online research. They may want to include information about how the two groups interpreted the foods, animal life, and trade practices of the other.

**5. Cracking the Case:** In order to determine information about an individual from analyzing their graves and bones, forensic anthropologists must take into account many different types of clues to help them unlock the story of who the person was and how they may have died. Ask students to choose one or more of the scenarios below and write a short paper about what this information could reveal about the person from the past.

**a)** A skeleton shows signs of a severe bone fracture, and forensic anthropologists determine the individual was about 18 years at the age of death. What might these clues reveal about the circumstances under which this individual died?

**b)** Forensic scientists determine that an early form of surgery had been performed on an individual in the 17th century. What are some of the clues that would lead them to draw these conclusions?

**c)** Analysis of a skeleton reveals notches or grooves in the front teeth. What might this clue reveal about the identity of the individual?

After providing answers to these clues, ask students to brainstorm and discuss additional clues that may reveal insights into individual and group life in the 17th-century Chesapeake. 🦴

## ACTIVITIES GRADES 9-12

The activities in this manual are intended to be creative suggestions for teachers looking for ways to implement the concepts and content explored in the *Written in Bone* exhibition in their classrooms. Some of these activities can be pursued before visiting the exhibition, and others will work most effectively after students have visited the exhibit or explored the themes it covers through other classroom course units. For teachers and students unable to visit the exhibition in person, these activities can be adapted to fit relevant course units. Teachers are also encouraged to visit the Smithsonian's National Museum of Natural History online to view companion materials associated with the exhibition: [www.mnh.si.edu/education/exhibitions/writteninbone](http://www.mnh.si.edu/education/exhibitions/writteninbone)

### VOCABULARY

Using the dictionary at [www.merriamwebster.com](http://www.merriamwebster.com), an Internet resource such as [www.History.com](http://www.History.com), or an encyclopedia, students should define or explain the significance of the following terms:

**antemortem**      **indentured servant**      **perimortem**      **rickets**  
**beveled**          **mitochondrial**      **postmortem**      **trephination**  
**carbon isotope**      **osteons**                      **radiocarbon**

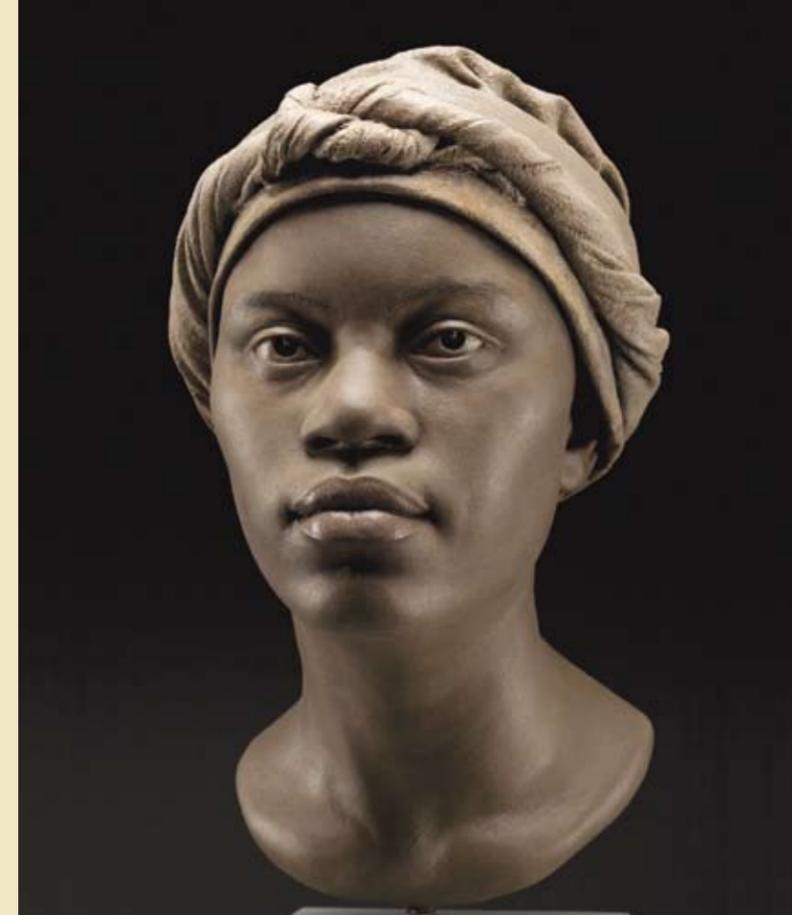
### COMPREHENSION QUESTIONS

The questions below can be presented to students for the purpose of classroom discussion, for a short written response, or as critical thinking questions to consider before or after viewing the exhibition.

1. What features of a person's skeleton change over time? How can forensic anthropologists use that information to establish identity?
2. What differences would you expect to find between the burials and bones of two men of the same age, one the wealthy governor of Jamestown and the other an indentured servant?
3. Other than the bones themselves, what do forensic anthropologists look at for clues to wealth and social status?
4. Would you expect there to be significant differences between our own skeletons and those of people born 100 years in the future? What sort of differences?
5. How did archaeological forensic anthropologists decide that they had found the skeleton of Bartholomew Gosnold?
6. What can archaeological evidence tell us about Jamestown that we cannot learn from other sources?
7. What can we learn from a series of burials – a cemetery, for example – that we could not from an individual burial? What typical features would you expect to find in a cemetery, and what conditions



Dr. Doug Owsley and team over grave of Col. Joseph Bridger (January 2007). Photo: Chip Clark, Smithsonian Institution



Sculpted bust by StudioEIS based on a forensic facial reconstruction by forensic artist Joanna Hughes. The skeleton of this young African woman was recovered during an archaeological excavation in Talbot County, Maryland. Photo: Chip Clark, Smithsonian Institution

or circumstances would lead people to diverge from those customs? What evidence would you look for?

8. Why are teeth studied so closely? How can they suggest a person's age? What evidence can teeth provide about diet, and what conclusions might be drawn from that evidence? How might the teeth of men and women of similar age differ in other ways, for example as a result of pipe smoking or cleaning?

### ACTIVITIES

1. **Laid To Rest:** This exhibition explores a variety of different burial practices and scenarios from the 17th century. Based on the information covered in the exhibit, or additional research, ask students to make a list of features they would expect to find in a typical burial of the 17th century. Then, ask students to make a list of examples where these practices were not followed and to suggest what this divergence from normal practice might lead forensic anthropologists to conclude. Students should then write a short essay about burials during this time period and what they reveal about the early colonies.

2. **Chesapeake Bone Biographies:** *Written in Bone* tells the story of several prominent individuals in the 17th-century Chesapeake including Bartholomew Gosnold and Anne Wolseley Calvert. Ask students to pick one of these people, or another in the exhibition, and create a "bone biography" about them. These biographies can be in written format, in PowerPoint, or any other format of the student's choosing and should include information about what forensic anthropologists have learned about each individual's life and death from their research. If students have not visited the exhibition in person, they can pursue additional research online or at the library to create these biographies.

3. **Africans in the New World:** The first Africans arrived in the Chesapeake in 1619. Although evidence in the written record about

Africans during the first few decades of settlement is not extensive, forensic anthropologists have been able to learn more about African lives during this time period by analyzing the bones and graves of those of African descent. Ask students to imagine that they were a forensic anthropologist investigating Africans in the early Chesapeake. Then, ask students to make a list of ten artifacts and/or characteristics found in the bones and teeth of skeletons from this period that provide clues into the lives of Africans. These lists can be presented in PowerPoint format, in bullet points, or as an official report.

4. **Cracking the Case:** In order to determine information about an individual by analyzing their graves and bones, forensic anthropologists must take into account many different types of clues to help them unlock the story of who the person was and how they may have died. Ask students to choose one or more of the scenarios below and write a short paper about what this information could reveal about the person from the past.

a) Forensic analysis of a baby's skeleton reveals that the child died of rickets. What are some clues that would indicate that the child had this disease, and what were some of the causes of this disease in the 17th century?

b) The skeletons of animals such as snakes and rats are discovered among the remains in the trash pits of a 17th-century Chesapeake colony. What would these findings suggest about life for the colonists during this time period?

c) Sea shells are discovered inside a simple coffin from the 17th century. What might forensic anthropologists conclude from this finding?

d) Forensic anthropologists conclude that a 17th-century child died of lead poisoning by analyzing his or her skeleton. What would be some of the telltale clues that this was the cause of death?

e) A lead coffin dating from the 17th-century Chesapeake is discovered with rosemary sprigs inside. What might these features suggest about the person who was buried inside?

f) The skull of a skeleton from the Jamestown settlement shows signs of trephination. What does this mean, and what might it suggest about the circumstances of death? After providing answers to these clues, ask students to brainstorm and discuss additional clues that may reveal insights into individual and group life in the 17th-century Chesapeake. 🦴

## PRIMARY SOURCES (GRADES 7-12)

The *Written in Bone* exhibition highlights a wide variety of sources from the early Chesapeake colonies. While the written records these settlements left behind were not extensive, historians and anthropologists do use a significant number of diaries, letters, and other writings as they study this time period. The vast majority of these sources are from the perspective of the English settlers; there are very few sources recorded by Native Americans and Africans in the early colonies. These writings provide students with additional insights into the encounters between people in the New World.

### PRIMARY SOURCE #1: AN INDENTURED SERVANT WRITES A LETTER HOME

“My most humble duty remembered to you, hoping in god of your good health, as I myself am at the making hereof. This is to let you understand that I you child am in a most heavy case by reason of the country, [which] is such that it causeth much sickness, [such] as the scurvy and the bloody flux and diverse other diseases, which maketh the body very poor and weak. And when we are sick there is nothing to comfort us...A mouthful of bread for a penny loaf must serve for four men which is most pitiful. [You would be grieved] if you did know as much as I [do], when people cry out day and night—Oh! That they were in England without their limbs and would not care to lose any limb to be in England again, yea, though they beg from door to door.”  
“Richard Frethorne to his father and mother, March 20, April 2 and 3, 1623,” in Susan Myra Kingsbury, ed., *The Records of the Virginia Company of London* (4 vols, Washington, D.C.: Government Printing Office, 1906-35), IV: 58.

### DISCUSSION QUESTIONS

1. Richard Frethorne was a young indentured servant when he wrote this letter to his parents in England. What does his letter tell you about the conditions faced by indentured servants in the Chesapeake?
2. What light can forensic anthropology and archaeology shed on the diet, labor, and living conditions of young people like Richard Frethorne?

### PRIMARY SOURCE #2: RIP: BARTHOLOMEW GOSNOLD

“The two and twentieth day of August, there died Captaine Bartholomew Gosnold one of our Councell, he was honorably buried, having all the Ordnance in the Fort shot off with many vollies of small shot.... There were never Englishmen left in a foreign Countrey in such misery as we were in this new discovered Virginia. We watched every three nights lying on the bare cold ground what weather soever came warded all the next day, which brought our men to be most feeble wretches, our food was but a small Can of Barley sod in water to five men a day, our

drink cold water taken out of the River, which was at a floud very salt, at a low tide full of slime and filth, which was the destruction of many of our men.” George Percy, “Observations gathered out of a Discourse of the Plantation of the Southerne Colonie in Virginia by the English, 1606,” originally published in Samuel Purchas, ed., *Hakluytus Posthumus or Purchas His Pilgrimes* (London, 1625).

### DISCUSSION QUESTIONS

1. George Percy’s grim narrative of the first summer and fall at Jamestown includes a list of deaths including Bartholomew Gosnold, one of the settlement’s leading figures. What would you expect to find in these burials?
2. How do you think you could distinguish the men buried at this time from those buried at a later date?

### PRIMARY SOURCE #3: THE STARVING TIME

“Now all of us at James Town beginning to feel that sharp prick of hunger which no man truly describe but he which has Tasted the bitterness thereof A world of miseries ensued as the Sequel will express unto you in so much that some to satisfy their hunger have robbed the store for the which I caused them to be executed. Then having fed upon horses and other beasts as long as they Lasted we were glad to make shift with vermine as dogs Cats Rats and mice All was fish that came to Net to satisfy cruel hunger as to eat Boots shoes or any other leather some could Come by And those being Spent and devoured some were enforced to search the woods and to feed upon Serpents and snakes and to dig the earth for wild and unknown Roots where many of our men were Cut off of and slain by the Savages...” George Percy, “A True Relation,” (c.1625). Full text available in Mark Nicholls, “George Percy’s ‘Trew Relacyon’: A Primary Source for the Virginia Settlement,” *Virginia Magazine of History and Biography* 113 (2005): 212-275 (text on 242-263). [NB: check 248-9]

### DISCUSSION QUESTIONS

1. George Percy’s gruesome description of the “starving time” in 1609-10 suggests that the settlement was on the brink of total collapse. What archaeological evidence would you expect to find from this period?
2. What does this document reveal about interactions between Native Americans and the English?

### BONUS ACTIVITY:

Settlers brought many new plants, animals, and diseases to the New World: rats, pigs, horses, smallpox, influenza, and others. Have students choose an animal, plant, or microbe, whether indigenous to the New World, Eurasia, or Africa, research it, and describe its role in the larger story of early America.

## ADDITIONAL RESOURCES

The Smithsonian’s National Museum of Natural History website on the *Written in Bone* exhibition:  
[www.mnh.si.edu/education/exhibitions/writteninbone](http://www.mnh.si.edu/education/exhibitions/writteninbone)

HISTORY’s special interactive sites on Jamestown:  
[www.history.com/classroom/jamestown](http://www.history.com/classroom/jamestown) and  
[www.history.com/classroom/jamestownstory](http://www.history.com/classroom/jamestownstory)

Virtual Jamestown:  
[www.virtualjamestown.org](http://www.virtualjamestown.org)

APVA Jamestown Rediscovery:  
[www.apva.org/jr.html](http://www.apva.org/jr.html)

The interactive site of Historic St. Mary’s City:  
[www.stmaryscity.org](http://www.stmaryscity.org)

Werowocomoco Research Project on the Powhatan Confederacy: <http://powhatan.wm.edu>

U.S. National Library of Medicine, National Institutes of Health: [www.nlm.nih.gov](http://www.nlm.nih.gov)

### BOOKS FOR EDUCATORS

Benedict, Jeff. *No Bone Unturned: Inside the World of a Top Forensic Scientist and His Work on America’s Most Notorious Crimes and Disasters* (HarperCollins, 2004).

Carr, Lois Green, Philip D. Morgan, and Jean B. Russo (editors). *Colonial Chesapeake Society* (University of North Carolina, 1991).

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Kelso, William. *Jamestown, The Buried Truth* (University of Virginia, 2008).

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Owsley, Doug and Karin Bruwelheide. *Written in Bone: Bone Biographer’s Casebook* (LeanTo Press, 2009).

Rountree, Helen C. *Pocahontas, Powhatan, Opechancanough: Three Indian Lives Changed by Jamestown* (University of Virginia, 2006).

### BOOKS FOR STUDENTS

Bial, Raymond. *The Powhatan* (Marshall Cavendish, 2002).

Braun, Eric. *The Story of Jamestown (Graphic History)* (Capstone, 2006).

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Carbone, Elisa. *Blood on the River: James Town, 1607* (Viking, 2006).

Collier, Christopher and James Lincoln Collier. *The Paradox of Jamestown: 1585 - 1700. The Drama of American History* (Marshall Cavendish, 1998).

Doherty, Kieran. *To Conquer is to Live: The Life of Captain John Smith of Jamestown* (21st Century Books, 2001).

“Jamestown.” Cobblestone: *The History Magazine for Young People. Vol. 15, April 1994* (New Hampshire: Cobblestone Publishing, 1994).

Walker, Sally M. *Written in Bone: Buried Lives of Jamestown and Colonial Maryland* (Carolrhoda Books, 2009).



Skeleton of a European male, 15 to 17 years old, found during an archaeological excavation of a 17th-century cellar. Leavy Neck site, Ann Arundel County’s Lost Towns Project, ca. 1665-1670. Photo: Chip Clark, Smithsonian Institution



  
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