

SKELETONS: Museum of Osteology

Forensic Pathology: Human Skulls

Teacher Resource

Grade Levels: 9th – 12th Grade

9th -12th Grade Oklahoma Academic Standards (OAS)

HS-LS3-1 Heredity: Inheritance and Variation of Traits

Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.

HS-LS3-2 Heredity: Inheritance and Variation of Traits

Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.

6.GM.3.2

Solve problems in various real-world and mathematical contexts that require the conversion of weights, capacities, geometric measurements, and time within the same measurement systems using appropriate units.

Program Overview:

Forensic Pathology: Human Skulls is a lab based program focusing on the deviation from a healthy or normal structure or function to reveal an abnormality, illness, or malformation of the human skull. After a basic introduction to skull osteology, pathology, and lab procedures, students will break-up into teams using a variety of tools from their forensic science kit to evaluate and document key evidence to support their results. They will then defend their findings to the class. Museum quality replicas of human skulls are used in this program.

Learning Objectives:

- Participants will successfully identify various pathological signatures to the skull and associated dentition.
- Participants will successfully utilize forensic measuring instruments to perform their evaluation.
- Participants will successfully work as teams in a lab environment— to document the expressed symptoms, research these symptoms, and communicate their findings to the class.

Background:

In this program, forensic pathology is the process of analyzing defects to the human skull and associated dentition that are the result of a disease or illness. Detailed cranial/dental measurements; knowledge of pathology signature/patterns; and comprehensive documentation are essential to forensic pathology.

Vocabulary:

- (medial/lateral)
- Adenoma
- Ballistics
- Achondroplasia
- Attrition
- Bregma

- Canine
- Concha
- Coronal Suture
- Craniosynostosis
- DNA technology
- External Auditory
- Foramen
- Foramen Magnum
- Forensic Science
- Frontal Bone
- Growth Hormone
- Incisor
- Infraorbital/Supraorbital
- Lambdoidal Suture
- Lamda
- Mandible
- Mastoid Process
- Maxillary Bone
- Meatus
- Mental Foramen
- Molar
- Mutation
- Nasal Bone
- Occipital Bone
- Occipital Condyle
- Occipital Protuberance
- Orbit
- Palatine
- Parietal Bone
- Pathology
- Premolar
- Prognathism
- Pterygoid process
- Sagittal Suture
- Serology
- Sphenoid Bone
- Squamosal Suture
- Squamous
- Styloid Process
- Supra-orbital Ridge
- Temporal Bone
- Toxicology
- Trace evidence
- Vomer
- Wormian Bone
- Wormian Suture
- Zygomatic Arch

Reference: visit the SKELETONS: Museum of Osteology Education web page at:
<http://skeletonmuseum.com/education>

Recommended Reading:

Katzenberg, M. Anne and Grauer, Anne L.

2018 *Biological Anthropology of the Human Skeleton*. Wiley-Blackwell, Hoboken, NJ.

Larsen, Clark Spencer

1999 *Bioarchaeology: Interpreting Behavior from the Human Skeleton*. Cambridge University Press, Cambridge, United Kingdom.

Ortner, Donald J.

2003 *Identification of Pathological Conditions in Human Skeletal Remains*. Academic Press, Cambridge, MA.

White, Tim D. and Folkens, Pieter A.

2005 *The Human Bone Manual*. Academic Press, Cambridge, MA.

White, Tim D., Black, Michael T. and Folkens, Pieter A.

2011 *Human Osteology*. Elsevier Science, Amsterdam, Netherlands.

While at SKELETONS:

- Visit the Pathology Exhibit and have students point out various types of bone and skull pathology.
- At the Pathology Exhibit, discuss the various bone cells and the role they play in the bone remodeling process.
- Discuss how certain bone pathologies would influence skull and bone growth from birth to adulthood.

- Discuss sexual dimorphism in humans while visiting the Pathology Exhibit and Primate Exhibit.
- Have your students discuss the scientific approach they would use to evaluate the human skull for various types of abnormalities.