

Anthropology Study Guide

Answers

1. Discuss the role of bones in forensic science.

Identification of individual;
id can link suspect to a
crime; id sex, age, height,
race, background

2. Briefly discuss the history behind forensic anthropology.

Europe 1800's races controversy, began using skull measurement to differentiate; looked at differences between male and female anatomy; formation, ageing, and fusing of bones. Leutgert murder case of 1897 sausage maker – remains in factory appear to be skull, finger, arm. 1932 FBI open first crime lab, partnered with Smithsonian Institute; 1939 W. Krogman published Guide to Identification of Human Skeletal Material; remains of soldiers killed in WWII id'ed using anthropologic techniques.; recent use of DNA found in mitochondria of cells used to id – such as with the Romanovs

3. Analyze skeletal remains and provide as much data as possible about the identity of the person.

Review Bone Measurement Lab

4. List characteristics of bone that demonstrate that bone is considered living.

Bones carry on a type of respiration called cellular respiration and consume energy like other living cells.

Inside of bones is a tissue called marrow, where blood cells are made.

Bones are regulated by hormones that affect the amount of calcium in the blood and in the hard part of the bone.

Bones are alive and capable of growth and repair.

5. Explain why bones are considered to be a tissue of the body.

Bones are a collection of differentiated cells that work for a common purpose.

6. Discuss several functions of bones.

Hold the body up

Protection of internal organs

Calcium and Phosphorus storage

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7. Compare the number of bones in an infant with an adult.

Infant – over 450

Adult - 206

8. Compare the skeleton of a newborn infant with the skeleton of an adult. Include in your answer:

The number of bones

The amount of cartilage

Infants start with 450 bones but as they grow, these bones began to fuse together so that by the time they are adults they have a total of 206 bones.

9. Discuss the development of bones. Include in your answer:

Osteoblasts

Osteoclasts

Cartilage

Osteocytes

Osteoblasts are the living cells and they deposit minerals (calcium phosphate) -which hardens to form bone. Newly trapped osteoblasts are called osteocytes. Osteoclasts are the other type of bone cells and their purpose or specialty is to dissolve bone. Bones need reshaping at times, and the osteoclasts secrete an enzyme to help dissolve certain areas of the bone for reshaping.

10. Describe the process of ossification of bones.

Osteoblasts are the living cells from which bone originate. As you grow, your bones undergo a process called ossification where the osteoblast cells travel to the center of the cartilage and deposit minerals (calcium phosphate) -which hardens to form bone.

11. Discuss cartilaginous lines found between bones:

What causes them to appear?

When do they disappear?

What happens to the lines?

How can the identification of cartilaginous lines be of any assistance to forensic scientists?

As the bones begin to fuse, the cartilaginous lines are visible – called the epiphysis. As the bones finish fusion (when the cartilage is fully replaced) the line is no longer visible. All the lines are generally gone by the age of 18 in females, and 25 in males. You can use the cartilaginous lines can help in determining the approximate age of the individual.

12. Explain the role of the periosteum in maintenance of bone.

Periosteum is a membrane that serves an important role in keeping bones moist and aiding in the repair of injuries.

13. Describe how bone is constantly being repaired and replaced as we grow.

This process continues throughout our life, but should an accident occur such as a broken bone, our blood can increase the amount of calcium phosphates to that area for healing. These newly trapped osteoblasts are called osteocytes.

14. Discuss what happens to your bones as you age.

Throughout an individual's lifetime, bones are being produced and being broken down. Children build more bones at a faster rate than the rate of bones being broken down resulting in bones increasing in size. After 30 years, process begins to reverse; bones deteriorate faster than they are built.

15. Briefly Discuss Osteoporosis.

Osteoporosis is a weakening of the bones and can be made worse by not getting enough calcium in the diet

16. Given formulas for stature (height) for different sexes and ethnic groups, to be able to estimate the approximate height of the person based on the size of different bones.

Human Remains Lab (lab page 2); also watch the femur and humerus videos online

17. Given the height of an individual in centimeters,
to be able to convert that measurement to inches
and then to
feet and inches.

*Human stature chart from Human Remains Lab (lab page
2); inches = cm/2.54*

18. Given a diagram of the suture marks on a pelvis, femur, or humerus, and the approximate age of ossification, be able to determine the estimated age of a these bones from the closing of these suture marks. This estimate will be given as a range of ages.

Human Remains Lab (lab page 3); also see Pelvis, femur, and humerus ID on class website

19. Given the presence or absence of wisdom teeth, determine if the person was at least 22 years of age, or less than 21 years of age.

Look for third set of molars among cranial remains

20. Given a diagram of male and female pelvis, to be able to explain the differences based upon:
- a. Width of the pelvic opening
 - b. Length and width of the sacrum (rump bone)
 - c. Sub Pubic angle
 - d. Shape of the pelvis opening: either heart or oval shaped
 - e. Shape of the pubis (triangular or rectangular)

All answers in human remains lab page 1; also see Pelvis video online

21. Given a diagram or actual skull, be able to distinguish between male and female based up:
- a. Smoothness of the skull
 - b. Presence or absence of the occipital protuberance (back of the head)
 - c. Brow ridges
 - d. Forehead shape: sloping or vertical
 - e. Shape of the eyes: rounded or rectangular
 - f. Jaw over 90 degrees or jaw at 90 degrees

All answers on human remains lab page 1; also see Gender (skull) video online

22. Distinguish between male and female skeletal remains based on skull, jaw, brow ridge, pelvis, and femur.

All answers in human remains lab page 1;

23. Given a skull, distinguish between Caucasoid, Negroid or Mongoloid races based upon

- a. Shape of the face
- b. Shape of the eye orbits
- c. Nasal index
- d. Teeth

Trait	Caucasoid	Mongoloid	Negroid
<i>Nasal Index</i>	< .48	.48 - .53	> .53
<i>Nasal Spine</i>	Prominent spine	Somewhat Prominent Spine	Very Small Spine
<i>Nasal silling/Guttering</i>	Sharp ridge (silling)	Rounded ridge	No Ridge (guttering)
<i>Prognathism</i>	Straight	Variable	Prognathic
<i>Shape of Orbital Openings</i>	Rounded, somewhat square	Rounded, somewhat circular	Rectangular

24. Given a femur, be able to explain how to eliminate Negroid as a racial group.

If your hand can't slide under the curvature of the femur

25. Describe how the following conditions are noted on skeletal remains:

- a. Arthritis – *joint deterioration*
- b. Osteoporosis - *overall bone density*
- c. Previous bone fractures - *look for scarring on bone*
- d. Nutritional deficiencies such as a lack of Vitamin D or Calcium - *bone density*
- e. Metal Prostheses – *looks much different than bone*

26. *Osteobiography* refers to showing one's bone life history through examination of skeletal remains. Explain how each can be determined:

- a. Male or female – *pelvis; skull*
- b. Age over 30 – *sutures (sagittal)*
- c. Age over 50 – *sutures (coronal)*
- d. Age under 18 – *long bone sutures*
- e. Age over 32 – *lambdoidal suture*
- f. Height – *length of long bones*
- g. Was the person left or right handed? *Bone density*
- h. What type of sports did the person participate in? *Skeletal trauma, bone density*
- i. Is there any record of previously broken bones? *Skeletal trauma analysis; xrays*
- j. Number of pregnancies *Notches on pubic bone*

27. Explain what can be determined about a person based on the following bone evidence:

a. Bones are smooth *skull, gender – female; pelvis, gender male*

b. Bones are knobby *skull, gender – male; pelvis, gender female*

c. Bones are very strong *occupation; gender; overall health*

d. Vertebrae have fused rings *injury history*

e. Joints show signs of wear and tear especially around the knees and hip joints. *Age; occupation, injury*

f. Notches are carved on the Pubic Bone *childbirth history*

g. Molars have come through into the oral cavity. *age*

28. Discuss how facial reconstruction is done using the skeleton of a head.

- *A face can be rebuilt from just skeletal remains*
- *Facial markers are positioned at critical locations*
- *Clay is contoured to follow the height of the markers*

29. Discuss the role of technology in forensic anthropology.

- *Computer programs perform a facial reconstruction*
- *Computer programs also can “age” missing persons and criminals*

30. Discuss skeletal trauma analysis:

- a. Why is this done? *to uncover a potential cause of death.*
- b. What are the forensic anthropologists trying to discover?
if damage to bones occurred before or after death
- c. How is it possible to determine if damage to a bone was done before or after death? *Looking at the trauma patterns on bones*
- d. How is it possible to identify the type of weapon used on a victim through skeletal analysis?

Distinct patterns exist for damage by

- *Environment*
- *Sharp force trauma*
- *Blunt force trauma*
- *Gunshot wounds*
- *Knife wounds*

31. Describe the difference between nuclear DNA and mitochondrial DNA.

o Nuclear DNA degenerates before mitochondrial DNA

o Mitochondrial DNA is found in the mitochondria and inherited only from the mother

o Compare results with living relatives on the mother's side of the family

32. In the Leutgert case, what was found that provided circumstantial evidence of murder, which satisfied *corpus delicti*?

A piece of the temporal bone.

33. In the Gacy case, what bone was broken in most of the skeletons that showed Gacy was likely the killer?

The hyoid bone