Station #1– Have a Heart

Identify the circulatory system component marked by 1 through 10 in ***figure 1-1***

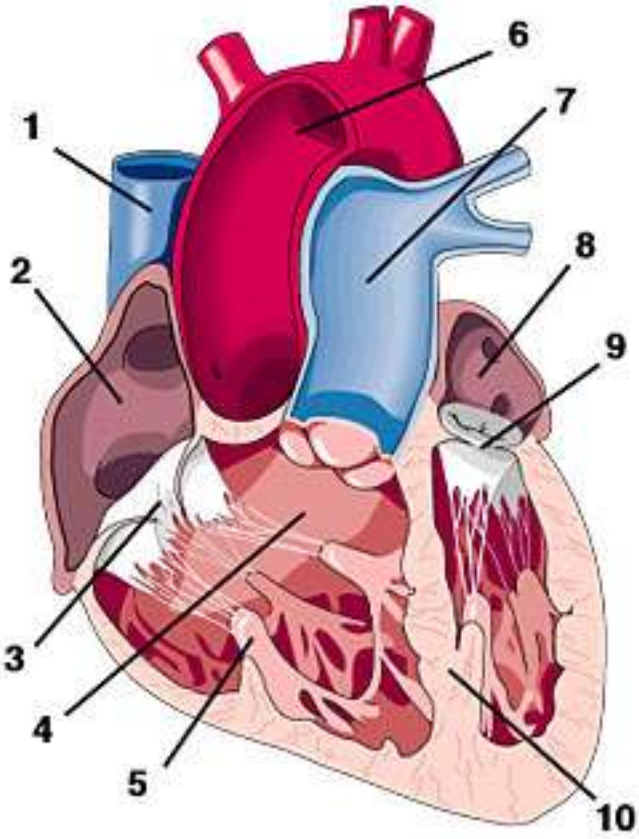


Figure 1-1

Match the following to their definitions:

11._____ Stroke Volume

12._____ Cardiac Output

13._____ Artery

14._____ Vein

15._____ Veinule

16._____ Capillaries

A. Vessels that carry blood away from the heart

B. Vessels that carry blood to the heart

C. Volume of blood pumped by the ventricles per minute

D. The smallest of a body's blood vessels, important for exchange of oxygen, carbon dioxide, and other substances between blood and tissue cells

E. Volume of blood pumped by the left ventricle of the heart in one contraction

F. Small blood vessel that allows deoxygenated blood to return from the capillary beds to the larger blood vessels

G. Small diameter blood vessel that extend and branch out from larger vessels to capillaries

17. If a child's mother has type O blood and the father has type AB blood, what blood types are possible for the child? Write down the letter(s) of each type that apply. (4pts)
    a. Type A
    b. Type B
    c. Type AB
    d. Type O

18.*Switched at birth?

Two families had babies at Stork Delivery Center on Valentine's Day. Having the first baby on this most romantic day has long been celebrated with candy hearts and foil balloons. Betty was convinced her Ashley was the first-born, and was anxious to show her off to family. Sue-Anne had twins, but was convinced her first-born, Michelle was born before Betty's baby. Both were upset that they weren't immediately showered with gifts and attention. In the commotion, the nurses lost track of which baby was whose. They carefully wrapped each baby and presented a baby to the new mothers.

Can you determine if the babies were switched? The following family tree shows the blood types of both families:

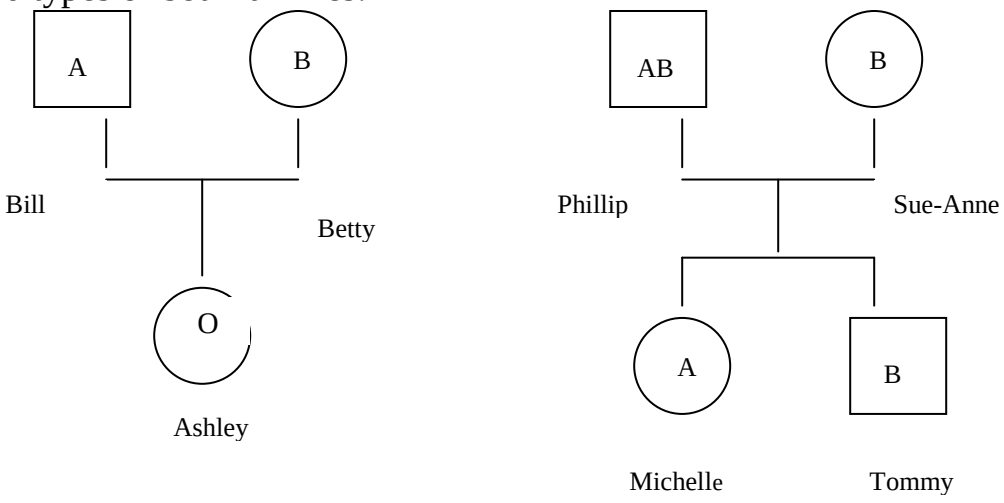


Figure 1-2

a. Is it possible for Betty and Bill to have a child who is type O? Briefly explain

b. Is it possible for baby Michelle to have blood type A, when her fraternal twin brother has type B? Briefly explain

c. Was a switch made at the hospital? Explain

Station #2– My Heart's a Flutter

1. What are the four layers of the wall of a vertebrate heart?
   a. pericardium, epicardium, choanocardium, sinus venosum
   b. pericardium, epicardium, myocardium, endocardium
   c. pericardium, trabeculae, left ventricle, epicardium
   d. sinus venosus, bulbus arteriosus, conus arteriosus, atrium

2. During ventricular diastole, pressure in the ventricles falls to ____ mm Hg, while the pressure within the large arteries is about ____ mm Hg.
   a. 120, 80
   b. 80, 120
   c. 80, 0
   d. 0, 80
   e. 40, 120

3. If a person has a systolic pressure of 100 mm Hg, and a diastolic pressure of 70 mm Hg, her pulse pressure is
   a. 170 mm Hg.
   b. 85 mm Hg.
   c. 30 mm Hg.
   d. 25 mm Hg.
   e. 20 mm Hg.

4. The _____ are located between the atria and ventricles (in bird and mammalian hearts) and allow blood to flow from the atrium to the ventricle, but not in the reverse direction.
   a. venae cavea
   b. atrioventricular nodes
   c. pacemakers
   d. atrioventricular valves

5. _____ determine(s) the contraction rate for the entire heart.
   a. Pacemaker cells
   b. The atrioventricular nodes
   c. The Purkinje fibers
   d. Blood pressure

6. At the capillary beds,
   a. the velocity of blood flow increases due to an increase in the total cross-sectional area of the capillaries.
   b. the velocity of blood flow increases due to reduced resistance within the thin capillary walls.
   c. the velocity of blood flow decreases due to a smaller cross-sectional area of each capillary.
   d. the velocity of blood flow decreases due to an increase in the total cross-sectional area of the capillaries.

7. When vertebrate blood is centrifuged, it separates into the following three components.
   a. plasma, red blood cells, white blood cells
   b. blood cells, water, lipids.
   c. proteins, fats, red blood cells.
   d. capillary cells, blood, water.

8. Assuming the human has a normal blood pressure of 120/80, calculate the mean arterial pressure (MAP) for this person.

9. If this person instead had a mean arterial pressure of 109 mm Hg, would you expect them to have high, normal, or low blood pressure?

10. A doctor tested and found this person had high cholesterol, high blood sugar and a history of heart disease. They perform an angiogram to observe blood flow on an x-ray. What do you predict they would notice about this person's arteries?

11. *What is this called? What is likely causing this blockage?

12. What are two controllable risk factors associated with the disease in question #10?

Station #3 – Take your breath away

1. *Welcome! You are an oxygen atom on your way to assist in metabolic function of the brain. Describe the general pathway through the human circulatory system beginning with the molecule to which you will attach and transport through the blood strea***m. Be as specific as you can as you describe your adventure through the circulatory system**

Oxygen bonds with **__(a)__** located in the **__(b)__** around the alveoli of the lungs. Oxygen rich blood travels through the **__(c)__** to the **__(d)__** of the heart. A contraction called **__(e)__** pushes the blood through the **__(f)__** into the **__(g)__**. A**__(h)__** cotnraction pushes oxygen rich blood through the **__(i)__** into the **__(j)__. The __(k)__** supplies blood to the brain.

Upon completion of metabolic functions, brain cells convert O2 to **__(l)__.** This waste product transfers back to the blood through a process called **__(m)__** into the capillary beds. Networks of **__(n)__** meet and empty oxygen-poor blood back to the heart via the **__(o)__.**

2. Other than the transport of oxygen (O2), identify three major functions of the circulatory system
   a.
   b.
   c.

3. Why is the exchange of oxygen in the alveoli often referred to as "transport down a concentration gradient"
   a. The oxygen is flowing down the body towards the ground
   b. There is less oxygen in the blood stream than in the lungs
   c. There is more carbon dioxide in the lungs
   d. There is a ramp the oxygen slides down to move from the lungs to the capillary beds.

4. Which of these layers in the wall of blood vessels contains smooth muscle?
   a. tunica adventitia
   b. tunica intima
   c. tunica media
   d. both b and c

5. Which of the following is not a function of the peripheral circulation?
   a. Exchange of nutrients, waste products, and gases
   b. Transport
   c. Regulation of blood pressure
   d. Carries lymph
   e. Directs blood flow

6. The amount of blood that the heart pumps per unit time is called the _____, and is a product of the _____ and the amount of blood the heart pumps with each beat, or the _____.
   a. stroke volume; heart rate; cardiac output
   b. cardiac output; heart rate; stroke volume
   c. cardiac output; diameter of the aorta; stroke volume
   d. cardiac output; mean arterial pressure; stroke volume

7. What is the average amount of blood pumped by the heart every minute?

8. How many beats per minute is considered normal sinus rhythm?

Station #4– My Heart Only Beats for You

1. Label the heartbeat parts found this EKG strip (on your answer sheet): P, Q, R, S, T

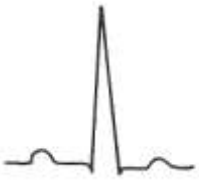


figure 4-1

2. BRIEFLY STATE what is happening in the heart during each phase.
   P =
   QRS =
   T =

3. What is the heart rate in beats per minute for the person with the following EKG? _____

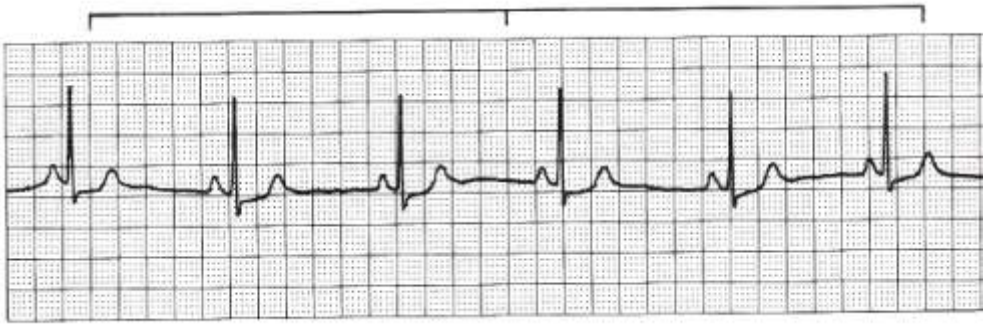


figure 4-2

4. The following EKG strip likely shows which pattern:

figure 4-3

   a. Normal Sinus Rhythm
   b. Bradycardia
   c. Tachycardia
   d. Ventricular fibrillation

5. The following EKG strip likely shows which pattern:

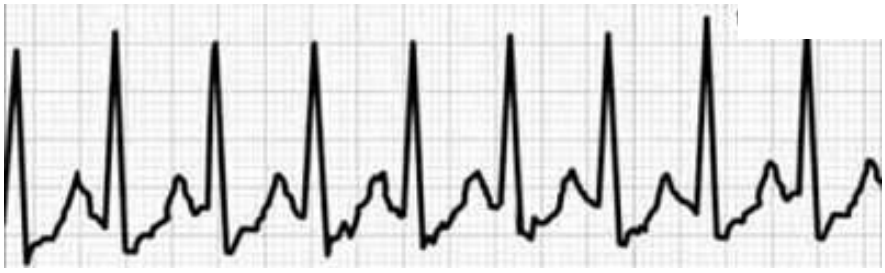


figure 4-4

a. Normal Sinus Rhythm
b. Bradycardia
c. Tachycardia
d. Ventricular fibrillation

6. Define hypertension:

7. List one controllable and one uncontrollable risk factors for hypertension:

Controllable:

Uncontrollable:

8. Blood pressure is expressed as two numbers, for example 120/80. Name both the top and bottom numbers and what they describe.

Top Number:

Bottom Number:

9. List 2 possible complications of untreated hypertension.

a.

b.

10. What is one possible treatment options for hypertension?

11. *What is the clinical significance of mean arterial pressure?

12. If a person has a blood pressure reading of 138/62 what is their M.A.P.?

Station #5 – Joints & Range of Motion

Match the joint with the function it is best suited:

1. Fibrous joints	a. consists of a gel-like sphere surrounded by layers of fibres
2. Cartilaginous	b. allow motion in two planes
3. Hinge joints	c. allow bones to move in many directions
4. Saddle Joints	d. supporting the brain
5. Ball and Socket joints	e. only allows a forward and backward motion

6. Identify the following joints using their motion-based classifications:
    a. Hip -
    b. Thumb (base of) -
    c. Knee -

7. Identify the following joints using their structural classifications
    a. Spinal vertebrae -
    b. Shoulder –
    c. Elbow –

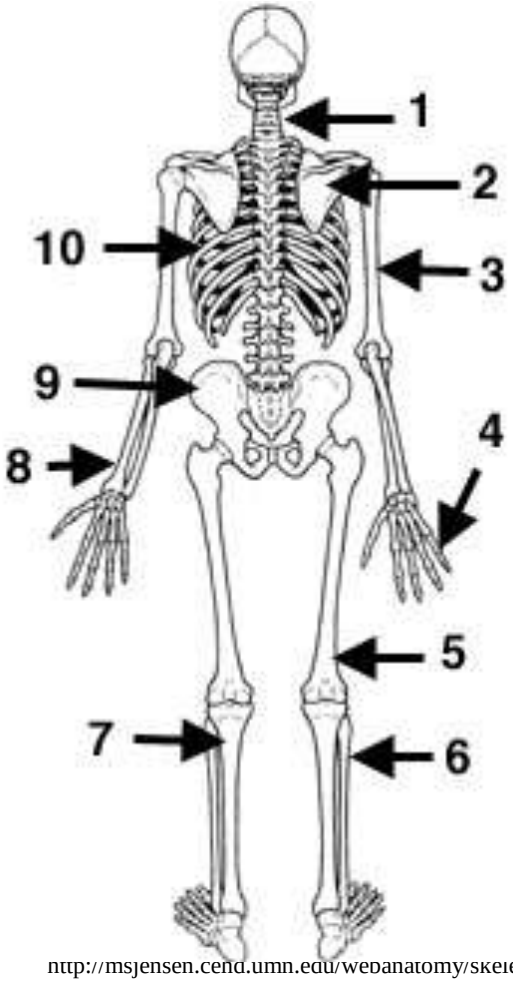
8. Complete the chart representing the origin and insertion points for various muscles. Identify the bones, origin, insertion points, or key actions for the following muscles:

Muscle	**Location**	**Origin**	**Insertion**	**Key Action**
Adductor Magnus	Inside upper leg	Pubis	a.	Adduction of Hip
Biceps femoris	Back of femur	Ischium and top of femur	Fibula	b.
Deltoid	c.	Clavice, Spine of Scapula	Humerus	Abduction of arm
Rectus abdominis	Front of torso	Pubis	Lower ribs	d.
Pectoralis Major	Chest	Sternum, Clavicle	e.	Horizontal flexion at shoulder joint
Gluteus maximus	Back of hip	Posterior hip, sacrum	Femur	f.

Station #6– The skeletal system

Is this Valentine's Day or Halloween?

Identify the 10 name and anatomical classification of the bones labeled on the following diagram:



http://msjensen.cehd.umn.edu/webanatomy/skeletal/

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

11. Name 3 functions of the skeletal system:

    a.
    b.
    c.

12. Sometimes bones of the skeletal system don't do their jobs correctly. One such disease, known as scoliosis, is often discovered during adolescence. Describe the primary indicator of scoliosis.

13. What is the cause of scoliosis?

14. How is scoliosis usually first diagnosed?

15. Is scoliosis more common in girls or boys?

16. Name 2 possible treatments options for scoliosis.

17. Name 2 possible complications of not treating scoliosis?

18. *What is a Cobb angle?

Station #7 – I Want to Hold Your Hand

1. The skeletal bones in ***figure 7-1*** are located on which region of the human skeleton
   a. Appendicular region
   b. Axial region
   c. Planar region

2. This is a posterior image of a hand. Which hand is this?
   a. Left Hand
   b. Right Hand

http://orthopedics.about.com/library/xray/blxray-fxraphand.htm

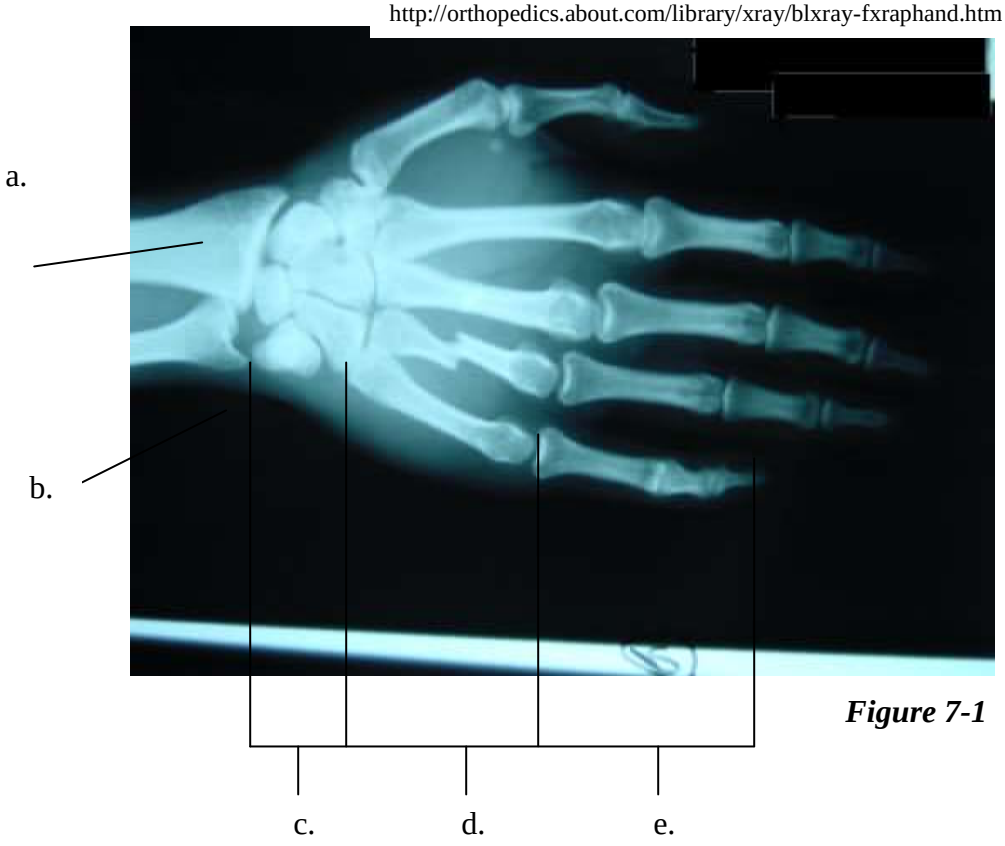


Figure 7-1

3. Identify the bones labeled a. – e.
   a. _____
   b. _____
   c. _____
   d. _____
   e. _____

4. Name the tool used to capture the image in ***figure 7-1***: _____

5. Look carefully at the image. What is the likely reason this image was taken?

6. What are the two layers of bone affected in ***figure 7-1***?

7. How will this bone heal itself over time?

    a. __
    b. __
    c. __
    d. __

8. Identify the type of cell in ***figure 7-2***, responsible for laying down new bone cells.

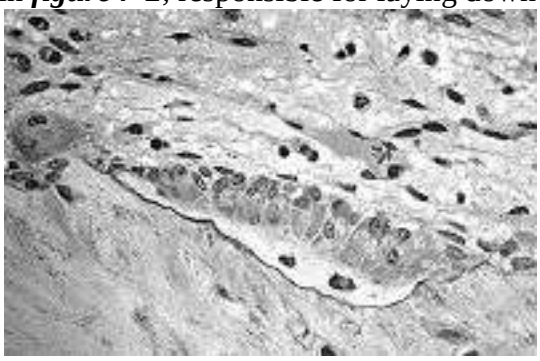


figure 7-2

9. Name the cells in ***figure 7-3*** responsible for remodeling a callous back as close as possible to the bone's original shape.

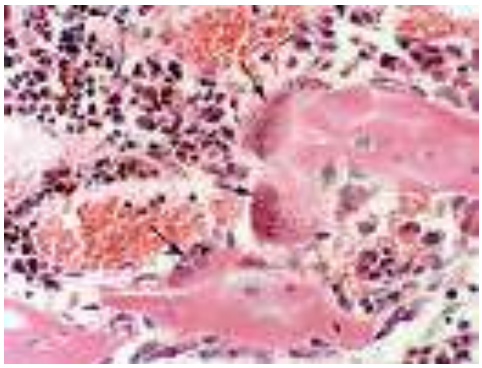


figure 7-3

10. Identify two affects that age might have on the health of the bones and related tissues in this hand.
    a.
    b.

Station #8– The Bone Yard

Use ***figure 8-1*** to answer questions 1-7

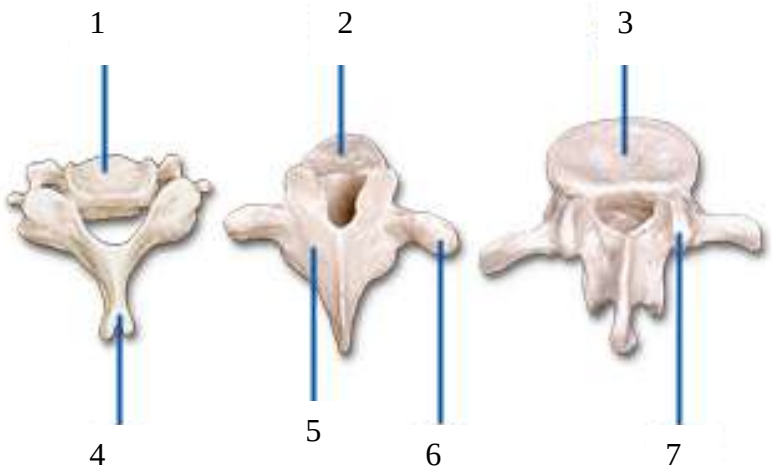


Figure 8-1*: http://www.midlandstech.com/science/kelleherk/210/LabMaterials*

1. Identify the feature and the bone.

2. Identify the bone.

3. Identify the bone feature.

4. Identify the bone feature.

5. Identify the bone feature.

6. Identify the bone feature.

7. Identify the bone feature.

8. Identify the bones below that belong to a human spine. Place them in order from the Skull down to the pelvis.

Atlas	**Axis**	**C-5**	**C-6**
C-9	**C-13**	**Coccyx**	**L-1**
L-5	**L-7**	**Sacrum**	**T-1**
T-6	**T-13**	**Y-1**	**Y-2**

Figure 8-2

9. Label components of the cross section

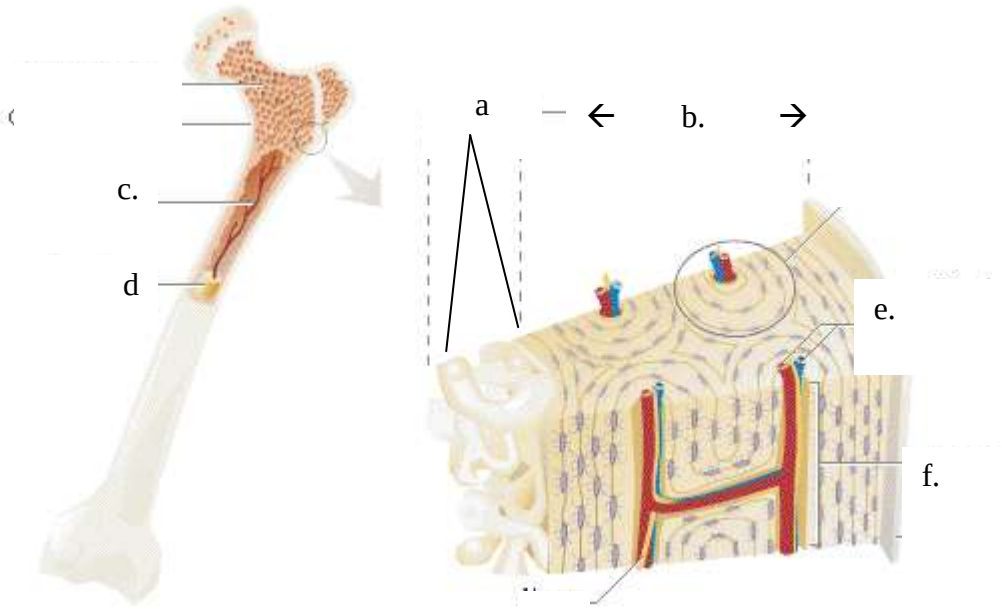


figure 8-2

10. What one function of the bone marrow?

*11. A person's bone density is tracked over many years. The images below include changes measured over time.

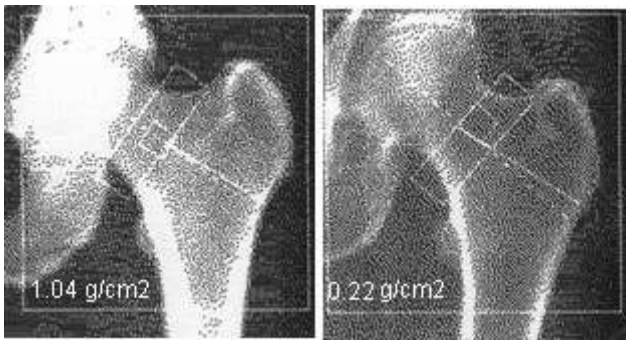


figure 8-3

a. What was the change in bone density during this time?

b. What disease is commonly associated with this level of bone loss?

c. What are 2 nutrients needed to keep bones strong?