

The Human Skeleton

1. What does a skeleton symbolize? **danger, death, a key, a secret outline of a novel or plan, the bones of the human body.** (6)
2. What purpose does a skeleton perform? **It forms an internal framework that supports the body and protects internal organs.** (6)
3. What links bones together? **movable joints** (6)
4. What moves bones? **muscles** (6)
5. What is a craniometer? **a device used to measure skull size** (6)
6. What happens to the elbow joint when the arm is straightened? **It locks.** (7)
7. What is the name of a series of woodcuts by Hans Holbein depicting skeletons luring noblemen to their death? **Dance of Death** (8)
8. What bones form the protective cage that protects vital organs in the chest? **rib bones, vertebrae, and breast bones** (8)
9. How many bones form the protective cage that protects the vital organs in the chest? **39** (8)
10. What adaptation allows humans to walk fully upright on two legs? **The human hipbone is adapted to align the legs and spine in a straight line.** (9)
11. How many bones are in a human hand? **27** (9)
12. What is a reliquary? **a container that holds the bones of a saint** (9)
13. Pirates wore the skull and crossbones as a symbol of **death and destruction.** (9)
14. What are the longest bones in the human body? **the leg bones** (10)
15. What is the largest joint in the human body? **the knee joint** (10)
16. How much weight does the human knee joint carry? **almost half of the body's weight** (10)

17. What functions as a natural shock absorber in the structure of the human foot? **the arch** (11)
18. The knobby parts of the ankle are part of **the ends of the shin bones.** (11)

From Bone to Stone

1. What serves as evidence of extinct animals? **fossils** (13)
2. What parts of animals are preserved as fossils? **shells, teeth, and bones** (12)
3. What long-extinct sea creatures are found worldwide in fossils from the Silurian period? **trilobites** (12)
4. What is the name of the extinct fish that is an ancestor of the modern squirrel fish? **Hoplopteryx** (12)
5. During what time period did Ichthyosaurs live? **the Jurassic period** (13)
6. When did ammonites inhabit the Earth? **about 180 million years ago** (13)
7. What part of a belemnite's body is found as fossil evidence? **the guard** (13)

Mammals

1. The basic mammalian skeleton consisted of **a spine, skull, ribs, four limbs, pelvis, leg bones, several small wrist or ankle bones, and five digits.** (14)
2. In some mammals, adaptations have turned the basic skeletal structures into **longer or shorter limbs, wings, paddles, larger or smaller limbs.** (14)
3. What are some of the adaptations in a badger's skeleton? **thick-boned limbs, strong feet with claws for digging, teeth modified for eating meat** (14)
4. In marine mammals, the legs and arms that are present in mammals have changed into **fins or are missing.** (15)
5. What does a short tail bone and arms as long as the legs indicate in an animal? **The animal dwells primarily on the ground.** (15)
6. What adaptations do tree-dwelling monkeys show? **long tails and longer back legs, adapted for leaping and balance** (15)
7. Unspecialized teeth indicates that an animal is an **omnivore.** (15)
8. Skeletons that have long, pointed teeth and claws indicate a mammal that is a **predator and a carnivore.** (16)
9. What adaptation is found in the bones of flying mammals? **Bones are extremely lightweight, fingers are adapted to support wing-like structures, and the shoulder blades and collar bones are larger to anchor the muscles that flap the wings.** (16)
10. What adaptations are visible in the skeleton of a hare? **large lower-back vertebrae, long hip bone, and very long back legs** (16)
11. What are the adaptations in a hare designed to provide? **speed in running** (16)
12. How fast can a hare run? **up to 50 mph (80 kph)** (16)

Birds

1. What are the two groups of animals that fly? **bats and birds** (18)
2. What provides strength to the lightweight bones of birds? **their tubular or case-like design** (18)
3. What adaptation in birds allows additional space to increase oxygen supply? **air sacs in some bones, which act as extensions of the lungs** (18)
4. In birds, the breastbone has evolved into a structure to which the wing-flapping muscles are attached. This structure is called a **keel**. (18)
5. What two extra bones act to anchor the breastbone to the spine? **the coracoids** (18)
6. What is the most flexible part of a bird's spine? **the vertebrae in a bird's neck** (18)
7. Of what type of protein are feathers made? **keratin** (18)
8. What is the name given to the collarbone in birds? **the wishbone** (18)

Fish, Reptiles, and Amphibians

1. What type of animal was the first vertebrate? **fish** (20)
2. When did the first fish appear on Earth? **approximately 500 million years ago** (20)
3. What adaptation from the basic skeleton of fish appeared with the evolution of amphibians? **legs** (20)
4. What is a prehensile tail? **a tail that can grip an object** (20)
5. In fish, what type of fin controls rolling when swimming? **the dorsal and ventral fins** (20)
6. What fins control the up and down motion of a fish? **the pectoral and pelvic fins** (20)
7. What is the name of the fins located on the tail of a fish? **the caudal fin** (21)
8. What is the structure that supports the fins of a fish? **spiny projections called radials** (20)
9. Why is the spine of a toad one of the shortest in the animal kingdom? **The short, stiff spine is able to absorb the stresses of leaping.** (21)
10. When did turtles first appear on Earth? **approximately 200 million years ago** (21)

Skeletons on the Outside

1. What is the name given to an animal that does not have a backbone? **an invertebrate** (22)
2. Are the majority of animals vertebrates or invertebrates? **invertebrates** (22)
3. What is the name of the outer skeleton found in animals such as insects? **exoskeleton** (22)
4. When an animal with an exoskeleton grows, how does it expand its exoskeleton?
The exoskeleton does not expand; it is shed and a new exoskeleton replaces it. (22)
5. Why do animals with exoskeletons tend to be small? **The exoskeleton becomes too heavy and thick to allow efficient muscle movements.** (22)
6. What material makes up the exoskeleton of beetles? **chitin** (22)
7. What is the heaviest insect in the world? **the goliath beetle** (22)
8. What material makes up the exoskeleton of diatoms? **silica** (22)
9. What parts make up the shell of a turtle? **the carapace, plastron, and scutes** (23)

Marine Exoskeleton

1. What are examples of crustaceans? **crabs, lobsters, prawns, shrimp** (24)
2. What adaptation do crustaceans have that allows for easier movement? **thin, flexible skin at the joints of their legs** (24)
3. What material makes up the shells of mollusks? **calcium** (24)
4. What is the name of the abdominal limbs found under the rear of the body of crustaceans, such as prawns and lobsters? **swimmerets** (24)
5. What are animals that have spiny skins or overlapping plates, such as sea urchins and starfish, called? **echinoderms** (24)
6. How do mollusks grow? **They grow by adding another coil or whorl to their shell.** (25)
7. What is unique about the seahorse? **It is a true fish, but has a prehensile tail.** (25)

The Human Skull and Teeth

1. What is the function of the skull? **It protects the brain.** (26)
2. What senses are centered in the skull? **the senses of smell, sight, hearing, and taste** (26)
3. What is the name given to the hole in the skull that houses the eyes? **the eye socket or orbit** (26)
4. What is the name of the nerve hole in the skull through which nerve endings from the teeth run? **the infra-orbital foramen** (26)
5. How many teeth do adult humans normally have? **32** (27)
6. What material covers the hard outer layer of a human tooth? **enamel** (27)
7. The nerves and blood vessels of a tooth are located in the **pulp.** (27)
8. What type of teeth are found in humans? **incisors, canine, premolars, and molars teeth** (27)
9. What bone forms the lower eye socket and anchors the upper end of the masseter muscle? **the cheekbone** (27)
10. What is the name of the cushioning membrane that lies between the skull and the human brain? **the meninges** (27)
11. How many teeth does a child under the age of six have? **20 baby teeth** (27)

How the Skull Is Built

1. How many pieces make up a baby's skull? **nearly 30 pieces** (28)
2. What are sutures? **immovable joints that form between the individual bones of the skull** (28)
3. What are fontanelles? **soft spots in a baby's skull, where the membrane has not yet turned to bone** (28)
4. At about what age do the fontanelles disappear? **around one year** (28)
5. At what age do the sutures in the skull begin to disappear? **between 30 and 40 years old** (28)
6. How many bones make up the cranium? **8** (28)
7. How many bones make up the facial bones? **14** (28)
8. What are the smallest bones in the body? **the ossicles of the inner ear** (28)
9. Approximately when did *Homo sapiens* appear on the Earth? **approximately 40,000 years ago** (28)
10. What is the mandible? **the lower jaw bone** (28)
11. What is the name of the bone that forms the lower back of the nasal cavity? **vomer** (28)
12. What bones form the roof of the mouth? **the maxillae and palatine** (28)
13. What bone functions to warm and moisten air as air enters the nose? **the inferior concha** (28)
14. What bones make up the eye socket? **the ethmoid bone and sphenoid bone** (28 & 29)
15. What is the name of the cheekbone? **the zygomatic bone** (29)
16. What do the bones of the cranium surround? **the brain** (29)

Animal Skulls

1. When did the jaw bone first evolve in animals? **approximately 450 million years ago, in fish** (30)
2. What allowed animals to catch large pieces of food and break it down into edible pieces? **the jaw bone** (30)
3. Why do the skulls of domestic dogs vary in shape? **Domestic dogs have been bred for different features, which affect their skull size and shape.** (30)
4. Forward-facing eye sockets indicate an animal that is a **predator.** (30)
5. What adaptation allows deer to feed on plants from narrow areas? **a narrow snout** (31)
6. What is the difference between antlers and horns? **Antlers are shed while horns are permanent.** (31)
7. What is the furry skin that covers antlers and is shed in the summer? **velvet** (31)

Animal Senses

1. The size and shape of skulls are the result of adaptations to fit a particular **lifestyle.** (32)
2. What adaptation is found in most animals that hunt by sight? **large eyes and eye sockets** (32)
3. What adaptation is found in most animals that hunt by smell? **a long snout** (32)
4. What adaptation is found in most animals that are nocturnal? **large eyes and eye sockets** (32)
5. What adaptation is found in most animals that eat grass? **a large mouth and strong cheek bones** (33)
6. Why must an owl turn its head in order to see in different directions? **Its eyes are forward-facing and are too large to swivel in its eye sockets.** (33)

Jaws and Feeding

1. What adaptations indicate the types of food an animal eats? **its jaws and teeth** (34)
2. What is an herbivore? **an animal that eats plants** (34)
3. In herbivores, what adaptations are found in the skull? **The lower jawbone is deep at the back to anchor the chewing muscles, special jaw joints allow sideways and up-and-down movement, and teeth are flat to allow grinding of food.** (34)
4. What are the name of the sharp, large front teeth found in rodents? **incisors** (34)
5. What type of food do carnivores eat? **meat** (35)
6. What type of teeth are found in carnivores? **canines and carnassial teeth** (35)
7. What is the function of carnassial teeth? **to cut up meat** (35)
8. What muscles control the jaws of carnivores? **the masseter and temporalis muscles** (35)
9. What are omnivores? **animals that eat both plants and meat** (35)

Animal Teeth

1. What type of jobs do teeth perform? **biting, slicing, chewing, crushing, cracking, gnawing, grooming, digging, defending, and communicating** (36)
2. What is the meaning of the phrase “long in the tooth”? **Something that is old. It comes from the fact that the gums shrink in older animals and expose more of the tooth.** (36)
3. What animal has the biggest teeth? **an elephant** (36)
4. What animal has the smallest teeth? **a slug** (36)
5. What are the types of teeth? **molars, carnassials, premolars, canines, and incisors** (36)
6. What type of teeth are found in herbivores? **molars** (36)
7. What type of tooth is an elephant’s tusk? **an incisor** (37)
8. What can a snake do that allows it to swallow large prey? **It can unhinge its jaw joints.** (37)
9. In sharks, how long does each tooth last before being replaced? **an average of eight to ten days** (37)

The Human Spine

1. What is another name for the spine? **the backbone** (38)
2. Originally, the spine was designed as a horizontal girder to support the weight of the **chest and abdomen.** (38)
3. Why is a human's spine an s-shaped curve? **It helps to bring the center of gravity of the upper body over the legs and feet and reduce muscle strain when standing.** (38)
4. The holes in each vertebra form a bony tunnel that functions to protect the **spinal cord.** (39)
5. What two vertebrae allow the head to nod and turn from side to side? **the atlas and the axis** (38)
6. How many vertebrae are located in the neck region? **seven** (38)
7. The vertebrae in the neck are called the **cervical vertebrae.** (38)
8. How many thoracic vertebrae are located in the human body? **twelve** (38)
9. How many lumbar vertebrae are in the human spine? **five** (39)
10. What is the name of the bone that forms the back part of the pelvis? **the sacrum** (39)
11. What is the name for the human tail bone? **the coccyx** (39)
12. What is found in between the vertebrae? **discs of cartilage** (39)
13. As a person grows older, what happens to the flexibility of the spinal column? **It decreases.** (39)

Animal Backbones

1. What body part do all vertebrates possess? **a spinal column or spine** (40)
2. What is the name for animals that do not possess a spinal column? **invertebrates** (40)
3. What is missing in the skeleton of a snake? **arm, hip, leg, and pelvis bones** (40)
4. A shark's skeleton is made out of what material? **cartilage** (41)
5. The tunnel through which the spinal cord runs is called the **neural canal**. (41)
6. The bony wings upon which muscles are anchored to the spinal column are called the **transverse process**. (41)

The Rib Cage

1. What organs do the rib cage protect? **the lungs, heart, liver, stomach, and kidneys** (42)
2. Ribs are thin and flexible so that they can **absorb impacts without cracking or breaking**. (42)
3. What muscle forms the base of the chest? **the diaphragm** (42)
4. What bones make up the chest cage? **the ribs, thoracic vertebrae, and the breastbone** (42)
5. What ribs are true ribs? **the first rib to the seventh rib pairs that connect to the breastbone by cartilage** (43)
6. What type of cartilage connects the ribs to the breastbone? **costal cartilage** (43)
7. What ribs are false ribs? **ribs eight through ten that connect to the ribs above, but not to the breastbone** (43)
8. What two ribs are floating ribs? **Ribs eleven and twelve do not connect to anything in the front of the rib cage**. (43)
9. How many ribs do most people have? **twelve** (43)

Human Hip Bones

1. How many bones make up the human hip bone? **six** (44)
2. What does the ilium join to at the base of the spine? **the sacrum** (44)
3. The bony girdle that is formed by the bones in the hip are called the **pelvis**. (44)
4. How does the human pelvis differ from four-legged animals? **The pelvis in humans is less elongated and rounded.** (44)
5. What organs do the pelvis protect? **the intestines, bladder, uterus, and reproductive organs** (45)
6. What muscle attaches to the front of the ilium? **the quadriceps** (45)
7. What is the name of the socket in the hip joint? **the acetabulum** (45)
8. How many vertebrae are fused together to form the sacrum? **five** (45)

Animal Hip Bones

1. What legs provide the driving force? **the rear legs** (46)
2. What type of socket is the thigh joint? **a ball-and-socket joint** (46)
3. What is the shape of the pelvis in most four-legged animals? **the pelvis is elongated** (46)
4. What name is used to describe animals that walk on all four legs? **quadrupeds** (47)
5. What strengthens the bones of birds, while allowing them to remain lightweight to enable flight? **Ridges strengthen them.** (47)
6. In birds, the pelvic bones are fused to the lower backbone to form the **synsacrum**. (47)

The Human Arm and Hand

1. What muscle stabilizes the shoulder blade on the back? **the trapezius muscle** (48)
2. What is the name of the shoulder blade? **the scapula** (48)
3. The muscles in the shoulder are responsible for moving what part of the body? **the upper arm** (48)
4. What muscles control the movement of the forearm? **the muscles in the upper arm** (48)
5. What muscles control the movement of the wrist and fingers? **the muscles in the forearm** (48)
6. When the bicep muscle contracts, what happens to the forearm? **The forearm is raised at the elbow.** (48)
7. When the tricep muscle contracts, what happens to the forearm? **The forearm straightens or is lowered at the elbow.** (48)
8. What type of joint is the elbow? **a hinge joint** (48)
9. What type of joint is the shoulder joint? **a ball-and-socket joint** (48)
10. What is the name of the upper arm bone? **the humerus** (48)
11. What shape is the humerus in cross-section? **It is tubular in the upper half and triangular in the lower half.** (48)
12. In babies, the wrist bones are made of **cartilage.** (49)
13. The wrist bones provide anchorage for what muscles? **the muscles that control the fingers** (49)
14. What type of joint is located at the base of the thumb? **a saddle joint** (49)
15. The finger bones are called the **metacarpals and phalanges.** (49)
16. How many bones are in the wrist? **eight** (49)

Arms, Wings, and Flippers

1. What forms have front limbs evolved into for specialized use by animals? (50) **flippers, fins, wings, hooks, paddles, and claws**
2. What are the two bones in the forearm? **the radius and the ulna** (50)
3. The bones of a bat's wing are supported by **finger bones**. (50)
4. What is found on the tip of the bat's first finger? **a claw** (50)
5. What was the largest flying creature to ever live on Earth? **a Pteranodon** (51)
6. The fins of a porpoise are equivalent to what bones in a human? **the arm, wrist, and finger bones** (51)

Animal Shoulder Blades

1. What is the primary function of the rear legs? **to move the whole body forward** (52)
2. What are the primary functions of the front legs? **They are used to cushion the impact when a body lands after a leap, hold food, strike at prey, defend from predators, and dig.** (52)
3. How many bones form the scapula in reptiles? **two** (53)
4. What bone is attached to the scapula in birds? **the coracoid bone** (53)
5. What is the function of the coracoid bone? **It braces the wing against the breastbone to help transmit the force of the wing-beating muscles.** (53)

The Human Leg and Foot

1. What is the thickest and strongest tendon in the body? **the Achilles tendon** (54)
2. How do the arms and legs work when a person walks? **The opposite arm comes forward when the opposite leg comes forward.** (54)
3. The thigh joint and muscles in the hip move the leg **backwards and forwards.** (54)
4. How many bones make up the ankle? **seven** (54)
5. What is the name of the thigh bone? **femur** (54)
6. What is the name of the largest bone in the ankle? **Calcaneus** (55)
7. What are the names of the two shinbones? **the tibia and fibula** (55)
8. What is the function of the fibula? **to anchor the muscles that move the foot and toes** (55)
9. What is the name of the kneecap bone? **patella** (55)
10. How are human feet adapted for walking? **The toes are shorter and the big toe is not opposable.** (55)

Animal Legs

1. The legs and feet of an animal give an indication of **its way of life.** (56)
2. What legs and feet are characteristic of a hunter? **well-muscled legs with claws** (56)
3. An animal that is large and heavy would normally have legs that are **short, thickset, and large-boned.** (56)
4. What type of legs and feet would a prey animal normally have? **long, slim legs with lightweight hooves** (56)
5. What type of foot does a raptor have? **talons** (56)
6. What is different about the rear legs of a frog? **The thigh, calf, and foot are all about the same size.** (56)
7. What type of feet does a monkey that lives in trees have? **The big toe is opposable.** (56)
8. What is the name given to even-toed hooved animals? **Artiodactyla** (57)
9. What is the name given to odd-toed hooved animals? **Perissodactyla** (57)
10. The hooves of a horse are the tip of its **third finger and third toe.** (57)
11. What is the largest bird in the world? **the ostrich** (57)

The Largest and Smallest Bones

1. What bones make up about a quarter of the human body's height? **the thigh bone** (58)
2. What primarily controls bone growth in children? **hormones** (58)
3. What causes gigantism? **a hormone condition that makes the bones grow very fast** (58)
4. What are the three bones that make up the ossicles? **stirrup (stapes), anvil (incus), and hammer (malleus)** (59)
5. What is the function of the ossicles? **They transmit sound vibrations from the eardrum to the inner ear.** (59)

Structure and Repair of Bones

1. How much of a living bone is water? **one-third** (60)
2. What part of a bone produces blood cells? **bone marrow** (60)
3. What mineral gives bone its hardness and rigidity? **calcium** (60)
4. What type of cell makes new bone? **osteoblasts** (60)
5. What type of cell destroys bone? **osteoclasts** (60)
6. What cells maintain bone by transferring nutrients and waste between blood and bone tissues? **osteocytes** (60)
7. What is the skin that covers a living bone? **periosteum** (60)
8. What type of bone contains the bone marrow? **spongy bone** (60)
9. Spongy bone is made up of tiny rods called **trabeculae**. (60)
10. What are the main materials that make up bone? **collagen, calcium, and phosphorus** (60)
11. What is formed first when a broken bone begins to heal? **A callus forms over the break.** (61)
12. What happens to the bone after a callus forms? **Osteoblasts move into the callus and hardens it into bone.** (61)
13. What happens to any rough bone left after the callus hardens into bone? **Osteoclasts break down the bone to make the mend smooth.** (61)
14. What do doctors use to assist the mending of broken bones? **splints, casts, screws, and plates** (61)

Glossary of Bone Names

1. From what languages are the names of bones derived? **Latin and Greek** (62)
2. How many bones are in the adult human body? **normally 206, but may vary from 200 to 210, depending on how the bones are counted** (62)
3. How many bones are in a human baby? **more than 300**

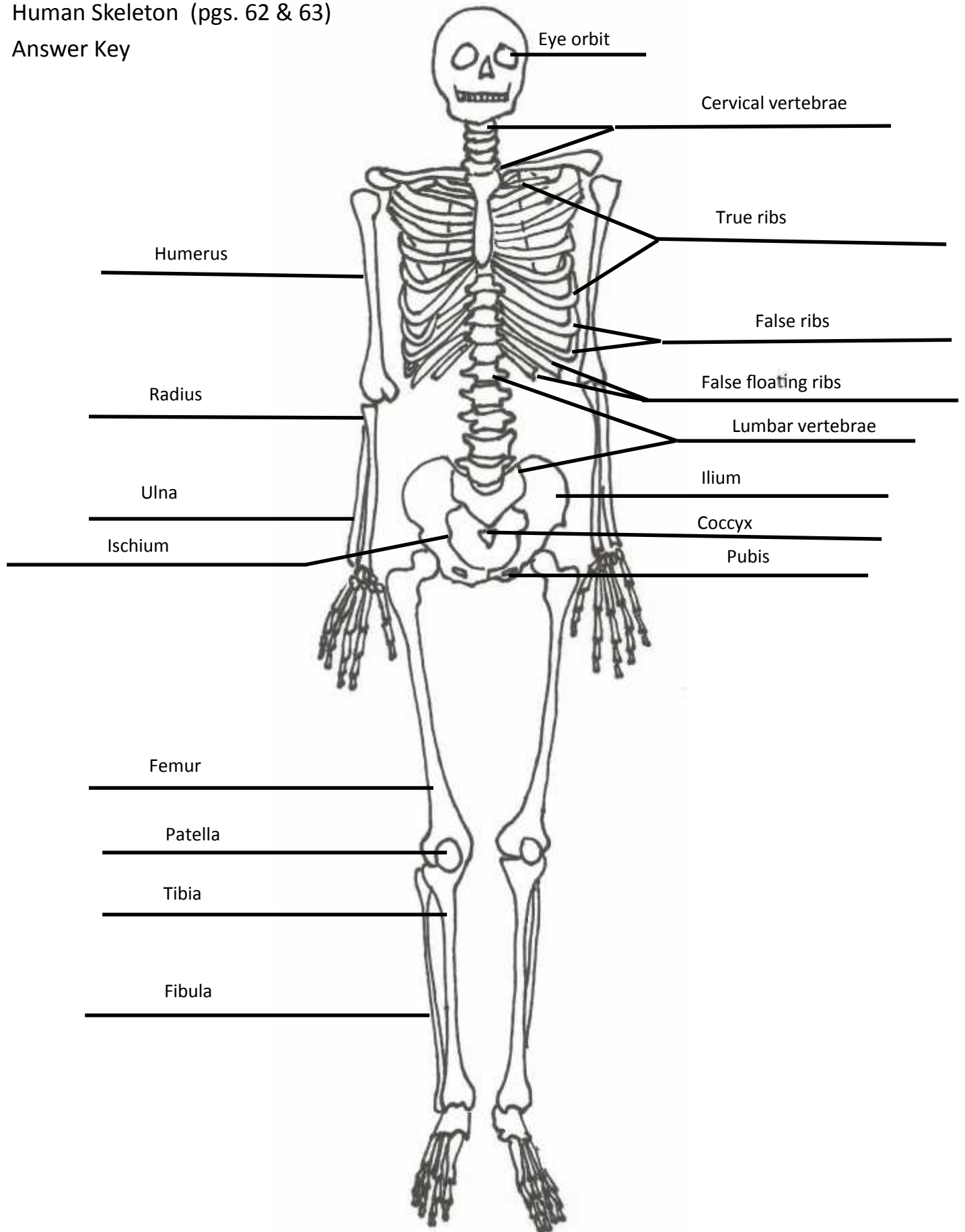
Did You Know? Fascinating Facts

1. What is the hardest material in the human body? **enamel** (64)
2. What is the second hardest material in the human body? **bone** (64)
3. What are the tiny extra bones that sometimes form within tendons? **sesamoid bones** (64)
4. What makes up the skeletons of sharks, skates, and rays? **cartilage** (64)
5. What type of material surrounds the core bone of a horn? **keratin** (64)
6. What makes up the base of a coral reef? **the skeletons of corals** (64)
7. How much of a person's body weight comes from the bones and teeth? **one-fifth** (64)
8. What percentage of the population is born with extra ribs? **about 5%** (64)
9. How much does a single molar from an adult elephant weigh? **about 10 lbs.** (65)
10. What is the meaning of the word *petrify*? **to turn a once-living plant or animal into stone** (65)
11. What is the tallest living land animal? **the giraffe** (65)
12. What is the largest skeleton of a living animal? **the blue whale** (65)
13. How big can a saltwater crocodile grow? **up to 33 feet** (65)
14. What is the smallest living bird? **the bee hummingbird** (65)

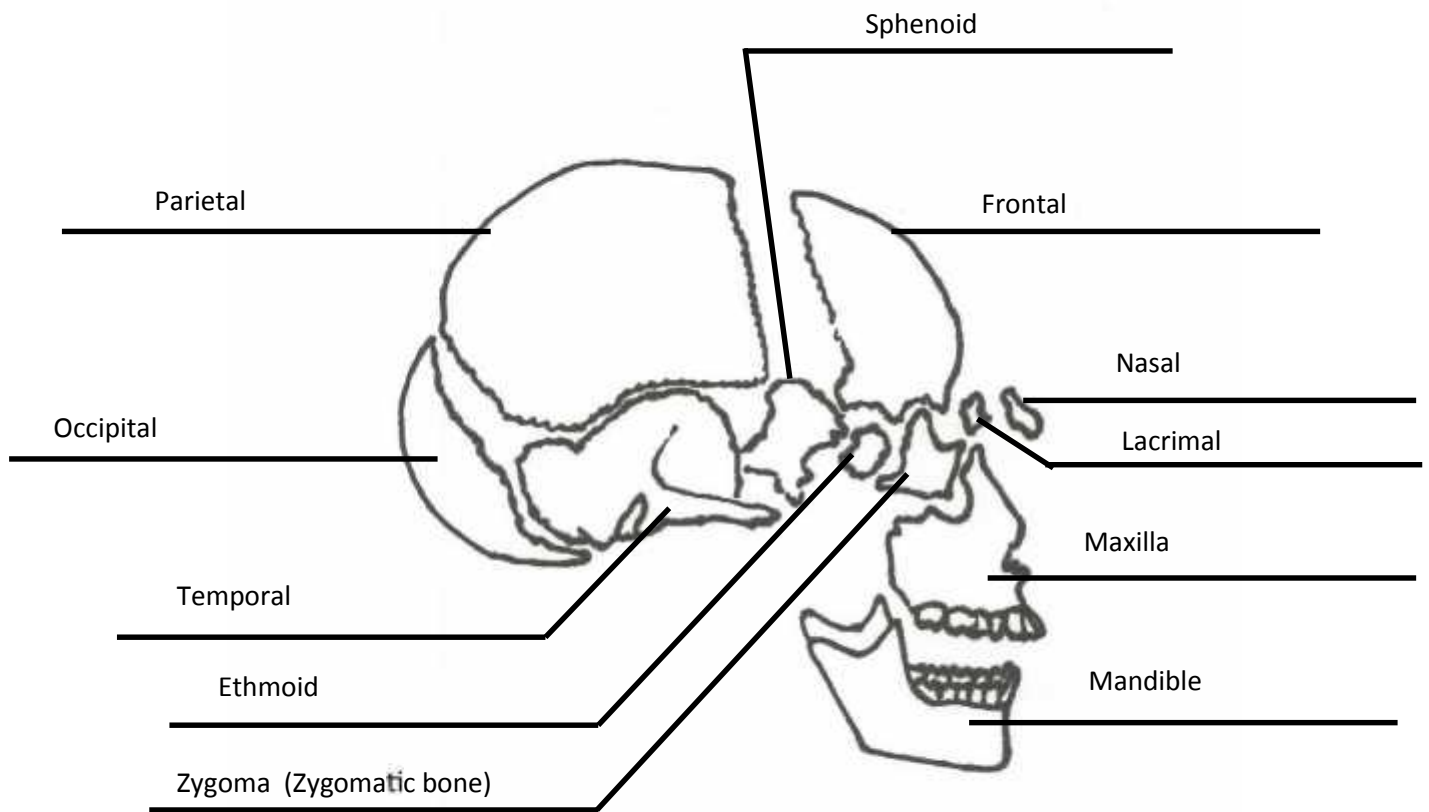
15. How big is the exoskeleton of the largest spider? **up to 11 inches** (65)
16. What is the largest prehistoric insect? **a dragonfly, Meganeuro monyi** (65)
17. What is the only whale that has tusks? **the narwhal** (66)
18. What type of skeleton does a worm have? **a hydrostatic skeleton** (66)
19. What allows a snake to coil and bend in all directions? **The joints in its backbone are very loose.** (66)
20. What are ligaments? **strong, fibrous bands of tissue that join bones together at joints** (66 & 70)
21. What is the function of the red blood cells in the body? **They carry oxygen around the body.** (67)
22. What is the function of the white blood cells in the body? **They destroy disease-causing bacteria and viruses.** (67)
23. What are tusks? **Tusks are teeth that project beyond the jaw.** (67)

Human Skeleton (pgs. 62 & 63)

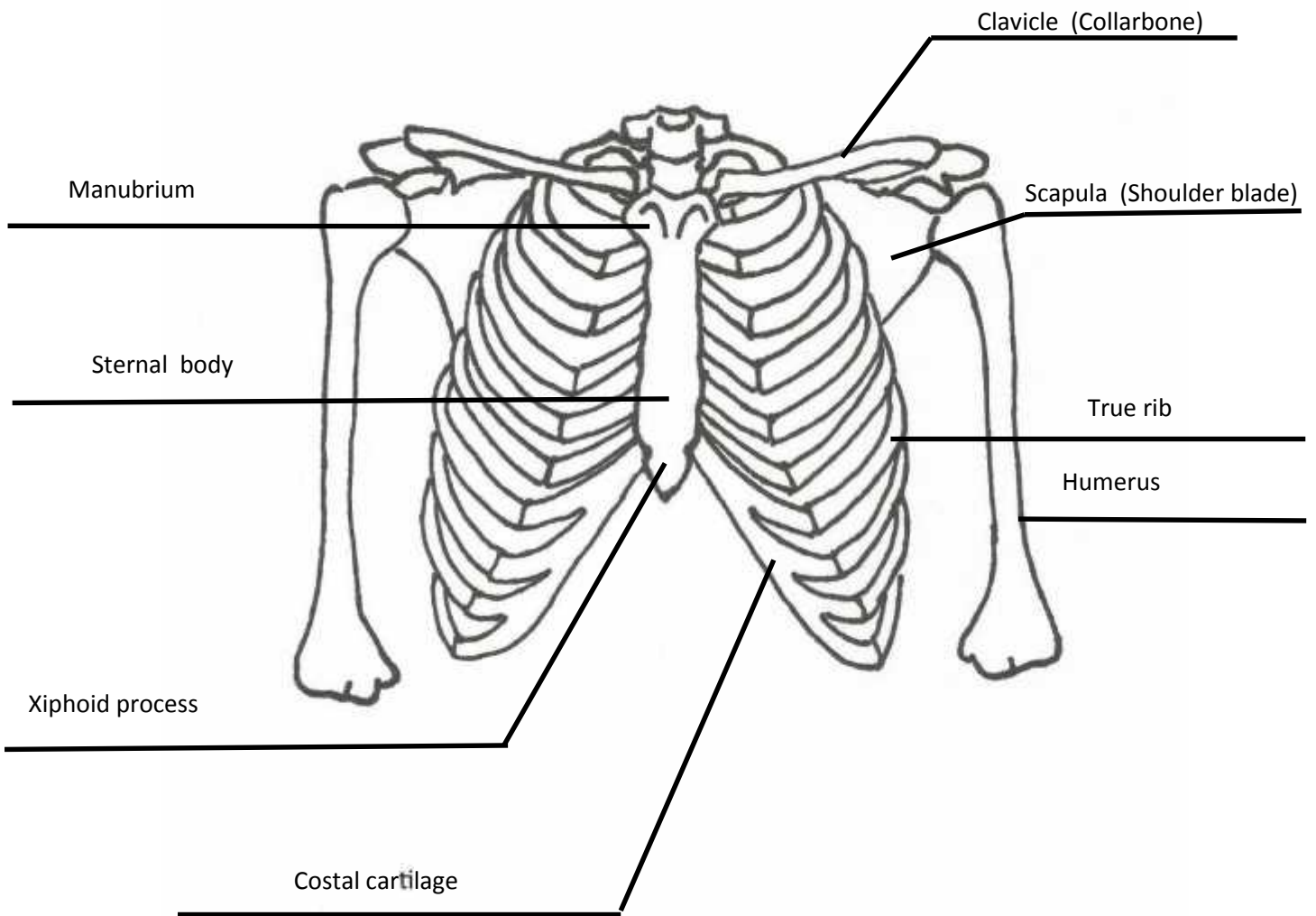
Answer Key



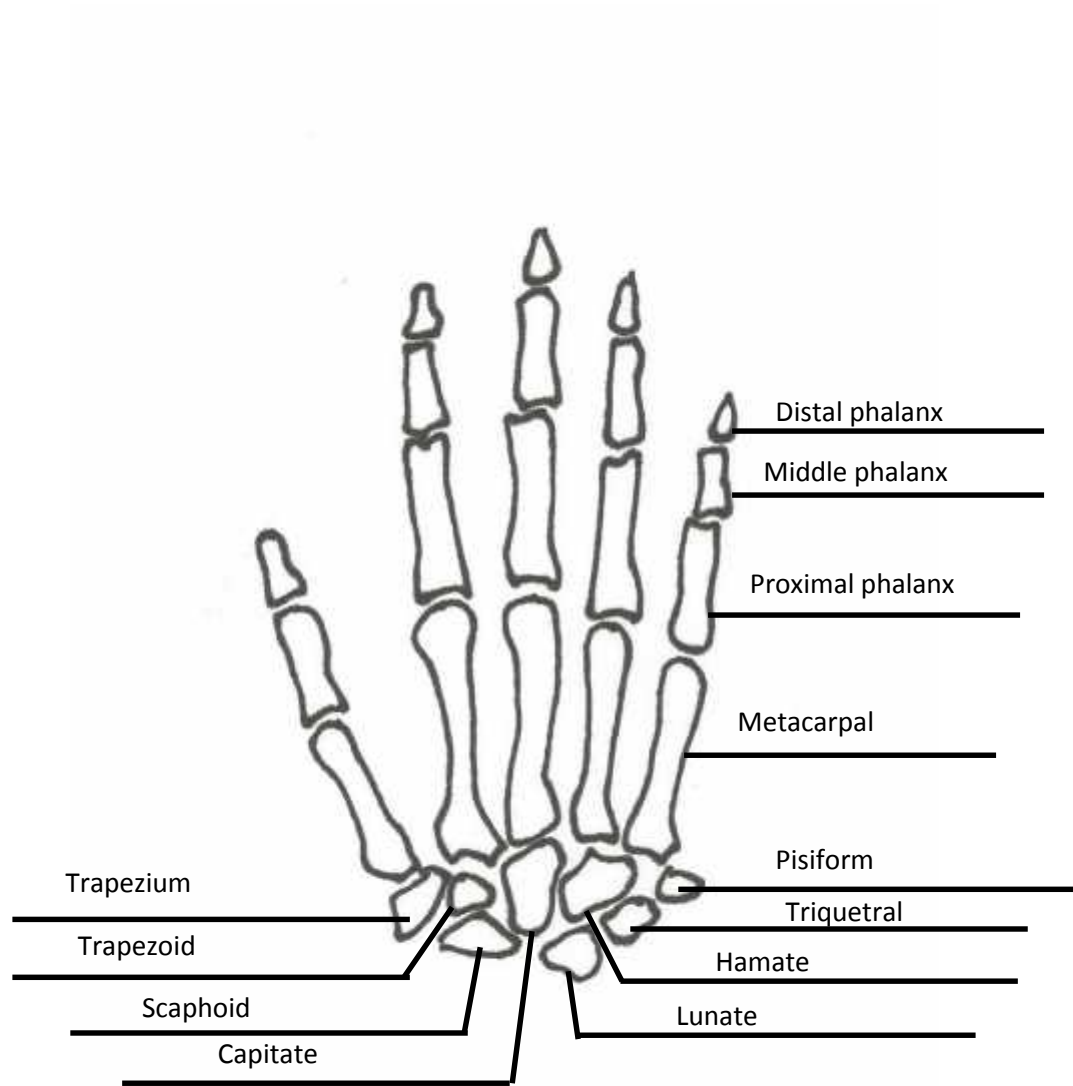
Human Skull Answer Key (Pg. 29)



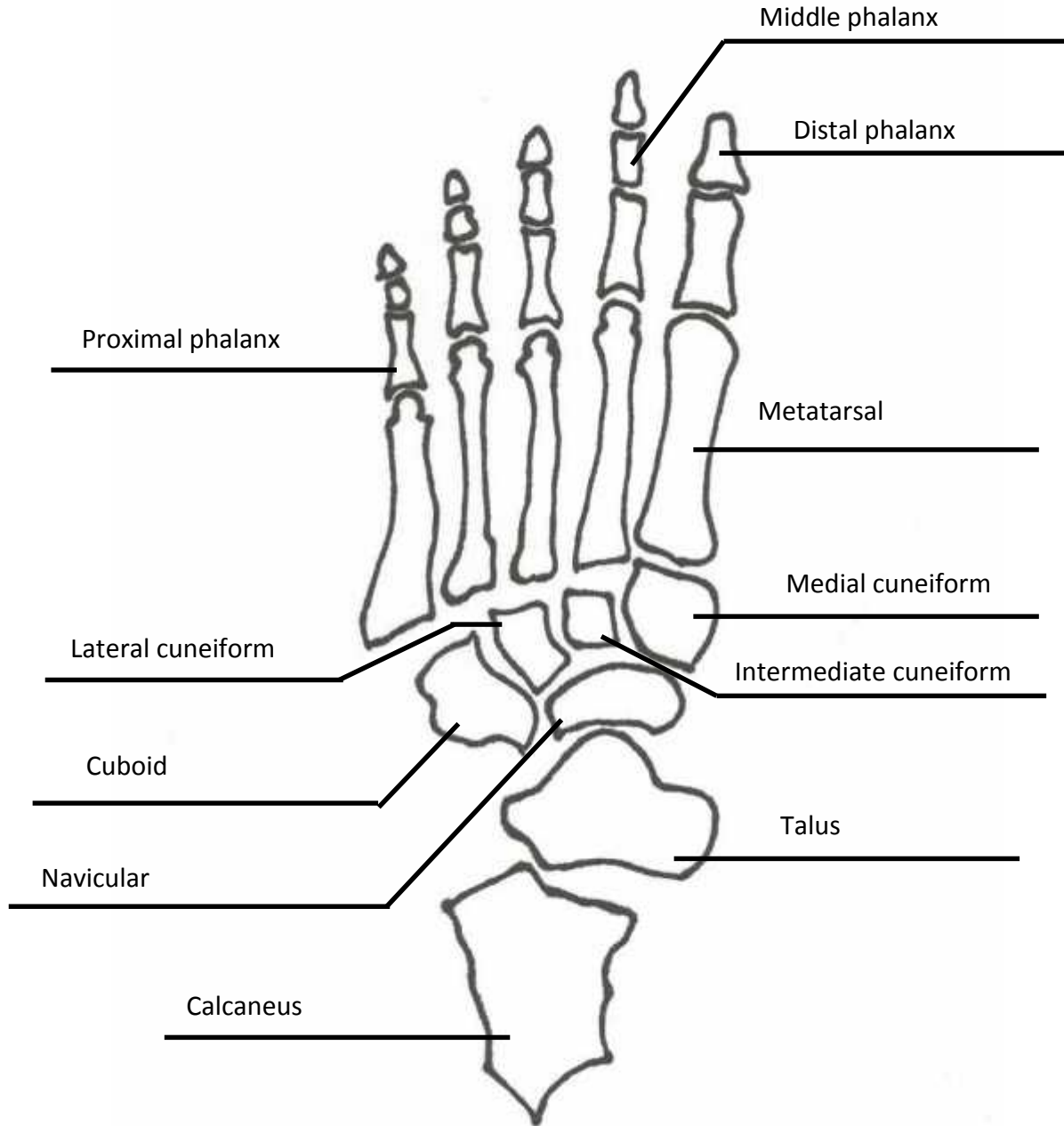
Human Rib Cage, Shoulder, and Upper Arm (Pgs. 62 & 63)
Answer Key



Human Hand Answer Key (pg. 62)



Human Foot Answer Key (pg. 63)



1. Ammonites are the ancestors of what modern animal? (13)
C. nautilus
2. Which of the following animals walk on their toes? (17)
A. cats
3. What mammal has a skeleton adapted for flight? (16)
D. bat
4. The skeletons of a shark is made of _____. (21)
C. cartilage
5. What is another name for the collarbone in birds? (19)
B. wishbone
6. Which of the following animals does not have an exoskeleton? (20-24)
A. bullfrog
7. What are scutes? (23)
B. hard scales that cover turtle shells

1. How many milk teeth do young children have? (27)
D. 20
2. What type of teeth are found at the front of the human jaw? (26)
E. incisors
3. What material makes up the layer of a tooth immediately under the enamel outer coat?
(27)
A. dentine
4. What is the name of the furry skin that covers antlers? (31)
D. velvet
5. What is another name for the cheekbone? (29)
C. zygoma
6. How long ago did *Homo sapiens neanderthalensis* appear on the earth? (28)
D. 100,000 to 40,000 years ago
7. What type of animal is a coypu? (32)
A. a rodent

1. Animals that eat both plants and animals are called _____. (35)
D. omnivores
2. Animals that eat plants are called _____. (34)
A. herbivores
3. What type of tooth is used for crushing and grinding food? (36)
A. premolars
4. What is the name of the topmost vertebra in the human backbone? (38)
C. atlas
5. How many lumbar vertebrae are in the human backbone? (39)
D. 12
6. What is another name for the tailbone? (39)
D. coccyx
7. The name of the pelvis comes from the Latin word for _____. (44)
C. basin

1. How long is the Achilles tendon in the human body? (54)
C. 6 inches
2. Where is the Achilles tendon located? (54)
D. lower leg
3. What is the name of the bone that forms the kneecap? (55)
E. patella
4. How long is the femur in a giraffe? (59)
A. 52 cm
5. What substance in bones produces red blood cells? (60)
C. marrow
6. What type of joint is the knee? (54)
B. hinge joint
7. What bone forms the hooves of a horse? (57)
A. the third finger or toe

1. What instrument is used to measure the dimensions of the skull? (6)
A. craniometer
2. How many bones are in the human hand? (9)
B. 27
3. What is the longest bone in the human body? (54)
A. femur
4. Fossil records show that the first animals to develop backbones were _____. (20)
B. fish
5. What is the name of the fins located along the back of a fish? (20)
E. dorsal fins
6. An invertebrate is an animal that does not have _____. (22)
A. a backbone
7. What is the hardest substance found in the human body? (27)
C. tooth enamel
8. How many teeth does the typical adult human have? (27)
A. 32
9. What is the name of the lower jaw bone? (28)
A. mandible
10. What is another name for the cheek bone? (29)
D. zygomatic bone
11. The muscle that closes the jaw bones is the _____. (35)
B. temporalis
12. What type of teeth are specialized to cut up meat? (35)
D. carnassials
13. How many thoracic vertebrae do humans have? (38)
D. 12

14. What two vertebrae in the upper spine allow the head to nod and twist? (38)

A. atlas and axis

15. What runs through the neural canal? (39)

C. spinal cord

16. What muscle forms the base of the chest cavity? (42)

C. diaphragm

17. How many pairs of ribs are typically found in an adult human? (42)

D. 12

18. What is another name for the hip socket? (45)

C. acetabulum

19. What is a quadruped? (47)

C. an animal that walks on four legs

20. In birds, what bones are fused to form the synsacrum? (47)

B. the pelvic bones and the lower backbones

21. What type of joint is the shoulder joint? (48)

A. ball and socket

22. How many vertebrae make up the human spine? (38 & 39)

A. 33

23. The radius is a bone in the _____. (49)

C. forearm

24. What type of joint is the ankle? (54)

A. composite joint

25. What is the name of the main shin bone? (55)

C. tibia

26. What is the largest bone in the ankle? (55)

C. calcaneus

27. What is the name of the heel bone? (55)
C. calcaneus
28. What controls bone growth in childhood? (58)
C. hormones
29. The tallest recorded human in history was _____. (58)
A. Robert Wadlow
30. What is the smallest bone in the human body? (59)
A. stirrup
31. What part of the human body produces red blood cells? (60)
B. bone marrow
32. What type of cell passes nutrients and wastes back and forth between the blood and bone tissues? (60)
B. osteocytes
33. What is the name of the skin that surrounds the outer shell of bone? (60)
A. periosteum
34. Spongy bone is made up of a network of tiny rods called _____. (60)
E. trabeculae
35. What are the main materials that make up bone? (60)
B. calcium, phosphorus, and collagen
36. The upper part of the breastbone is called the _____. (60)
C. manubrium
37. Which of the following is NOT part of the anklebone? (63)
D. distal phalanx
38. The distal phalanx forms the tip of the _____. (63)
D. All of the above
39. What percentage of the human population is born with one or more extra ribs? (64)
B. 5%

40. What bone is missing in snakes that allows them to swallow large animals whole? (66)

B. sternum

41. What material makes up baleen in whales? (66)

E. keratin

42. A scientist who studies fossilized bones is called _____. (68)

B. a paleontologist

43. What is the process in which cartilage turns into hard bone? (71)

B. ossification

44. The honeycomb-like material found in the interior of bones is called _____. (71)

D. spongy bone

45. What is another name for the collarbone? (62)

B. clavicle

46. In birds, what bone takes the weight of the body and balances it over the legs? (47)

A. ilium

47. Exoskeletons are made of a light, strong material called _____. (70)

E. chitin

48. What animal has the largest skeleton of all living animals? (65)

C. blue whale

49. What is the structural protein found in fingernails? (64)

E. keratin

50. How large is the hammer bone in the human ear? (59)

B. 8 mm

1. What is the largest joint in the human body? (10)
A. knee
2. What is the name of the large flange on the breastbone of birds? (18)
A. keel
3. In birds, what bones function to brace the breastbone against the spine? (18 & 19)
C. coracoids
4. How long ago did the first vertebrate animals appear on Earth? (20)
C. 500 million years ago
5. The hard outer casing of invertebrates is called _____. (22)
A. an exoskeleton
6. What is the heaviest insect in the world? (22)
E. Goliath beetle
7. What muscles control the movement of the upper and lower jaws? (27)
A. the temporalis and masseter muscles
8. The soft spots in a baby's skull are called _____. (28)
C. fontanelles
9. What bone makes up the back of the roof of the mouth? (28)
D. palatine
10. What is the bone located at the lower back portion of the skull? (29)
D. occipital bone
11. What is the furry skin that covers antlers and provides nourishment for growing antlers?
(31) C. velvet
12. The animal with the largest teeth is the _____. (36)
D. elephant
13. What type of tooth is the tusk of an elephant? (37)
E. incisor

14. Ivory is formed by a combination of _____. (37)
B. dentine and calcium minerals
15. How much ivory does an elephant produce during its lifetime? (37)
A. half a ton
16. How many bones make up the human lumbar vertebrae? (39)
B. 5
17. How many pairs of ribs are connected to the breastbone in a human? (43)
C. 7
18. What is the name given to the eleventh and twelfth pair of ribs in the human rib cage? (43)
B. floating ribs
19. For normal body function, skeletal muscles must work in _____. (48)
B. opposing pairs
20. What type of joint is found at the base of each finger? (48)
C. saddle joint
21. Where is costal cartilage found in the human body? (43)
D. rib cage
22. How many bones are there in the human hand? (49)
B. 19
23. In what part of the human body are the carpal bones located? (49)
D. wrist
24. What is the largest flying animal ever to live on the Earth? (51)
D. Pteranodon
25. What is the thickest and strongest tendon in the human body? (54)
B. Achilles tendon
26. What type of joint is the hip joint? (54)
B. ball-and-socket joint

27. What is the largest bone in the human body? (54)
D. femur
28. How large is the stirrup bone in the human ear? (59)
A. 3 mm
29. What type of cells destroy bone, releasing minerals into the blood? (60)
C. osteoclasts
30. The ossicles function to _____. (59)
D. transfer sound vibrations from the eardrum to the inner ear
31. Red blood cells are made in the _____. (60)
C. bone marrow
32. Which of the following is not a bone in the wrist? (62)
E. metacarpal
33. What bone is located between the calcaneus and the navicular? (63)
E. talus
34. What is the second-hardest material in the human body? (64)
D. compact bone
35. What is the largest crustacean in the world? (65)
C. Japanese spider crab
36. Of the twelve ribs in the rib cage, which set of ribs is the longest? (42 & 43)
D. 7th
37. A short tail in a mammalian skeleton indicates that the animal dwells primarily _____. (15)
C. on the ground
38. Unspecialized teeth are an indicator of an animal that is _____. (15)
C. an omnivore
39. In birds, the lower backbones and hip bone are fused together to form the _____. (18)
A. synsacrum

40. Which of the following is not an example of a crustacean? (24)
C. Gibbon
41. Which of the following is an example of an echinoderm? (24)
E. A and B
42. Nerve endings from the teeth pass through a hole in the skull called the _____. (26)
A. infra-orbital foramen
43. What part of the human brain is associated with intelligence? (27)
D. cerebral cortex
44. How many pieces make up the cranium of an infant human? (28)
E. close to 30
45. How many bones make up an adult human cranium? (28)
C. 8
46. What is the scientific name for the domestic dog? (30)
C. Canis familiaris
47. Animals with large orbits typically are _____. (32)
D. All of the above
48. The region of the spinal column that is most susceptible to ruptured or popped disks is the _____. (39)
D. lumbar vertebrae
49. How many bones make up the human cervical vertebrae? (38)
C. 7
50. What is the name of the tail fins of a fish? (21)
D. caudal fins