Name: _____ Date: _____

# How Many Bones Are in the Human Body?

Reading level 11 (7th grade) · 1100 words

The X-ray of Kwesi's hand glowed on the screen like a ghost. Bones he had never seen floated there in rows, and across one finger ran a thin dark line. That was the crack. Kwesi held his own hand up beside the screen and wiggled his fingers to match. "How many bones are in the human body?" he asked the technician, because after a morning of waiting he could not stop wondering. She smiled. "In a grown-up, 206. But the real answer is stranger than a number."

While the printer hummed, the technician pointed to a skeleton chart on the wall, and her finger stopped at the ribs. "Those show you what a skeleton is for," she said. Ribs curve around the chest like a cage, and the cage protects the heart and lungs from knocks and bumps. The bottom two pairs are called floating ribs, because they never reach the breastbone in front, although they are still fastened firmly to the spine at the back. Kwesi traced the curve of the chart's ribs in the air above his own chest, imagining the cage that was hiding inside him.

"Now here is the twist," said the technician. "You started life with more bones than I have now." A newborn is counted at somewhere between 270 and 300 bones, and neither count is a mistake. Different counters give different totals, because the answer depends on what you decide to call one bone. Kwesi stared at his hand and frowned, and he tried to count the bones in his fingers. If a baby really had so many extra bones, where had they all gone?

They had grown together. A child's spine is a stack of about 33 small ring-shaped bones, but at its base five of them fuse into one wedge called the sacrum, and about four more fuse into the tailbone. Nine bones become two. "Fuse means they join so tightly that you cannot tell where one ends and the next one begins," said the technician. A baby has more bones in smaller pieces, and an adult has fewer bones in bigger pieces. Kwesi pressed the base of his own back and tried to imagine those bones slowly melting together over many years.

Even the bones a baby already has are not completely bone yet. A newborn's kneecap is soft cartilage, the same bendy material Kwesi could feel at the top of his ear. At about age three the kneecap begins to turn into bone, and the change is not finished until around puberty. Kwesi pressed his knee with his good hand. Underneath, the kneecap had been slowly hardening for years without him noticing a thing. It was a strange idea that part of his own body was still in the middle of turning into something else.

Bone is alive, which surprises people who have only ever seen museum skeletons. Dry museum bones are just the leftovers. Inside Kwesi, cells were taking old bone apart and building new bone in its place. About a tenth of an adult's skeleton is rebuilt each year. Kwesi

tapped the desk and wondered how many tiny workers were busy under his fingertips, and he held his sore finger very still. The same cleanup cells would soon get to work on his finger.

Inside many bones sits a soft jelly called marrow, and it works like a factory that never closes. Marrow makes your blood cells, including more than two million new red ones every second. Kwesi squeezed his fist and counted slowly to ten. In those ten seconds, more than twenty million new red cells had joined his blood. Somewhere inside the bones of his arm and back, millions of tiny red cells were being made, right then. He had never once thought of a bone as a place where blood is born.

Bones never move on their own. Muscles are fastened to them by strong cords, and when a muscle pulls, the bone swings around a joint. "Try making a fist," said the technician. Kwesi curled his good fingers and felt each joint turn. Then he tried to bend his splinted finger and felt the tight ache of the crack, right where the pulling muscle tugged against the splint. A single bone, he realized, was only one piece of a very busy machine.

One bone is a loner. The hyoid, a small bone shaped like a horseshoe, sits high in the front of the neck, and it does not meet any other bone at all. Muscles hold it up from several sides, like the ropes of a small tent. "Put a finger under your chin and swallow," said the technician. Kwesi did, and felt something small lift and drop. That was the hyoid, helping the tongue move and the throat swallow, floating in its web of muscle. Kwesi had expected a hidden bone to feel like a secret, but all he felt was an ordinary swallow.

In 1543, a doctor named Andreas Vesalius published a giant book on the human body. For centuries, doctors had trusted a Roman named Galen, who had mostly studied animals, including macaque monkeys, because dissecting people was not allowed in Rome. Vesalius, unlike Galen, was able to study real human bodies. He found that the lower jaw is a single bone and not two, which is a fact you can check by feeling your own chin. "He checked the old book against the real thing," said the technician, "and he said what he found."

So why does everyone say 206? Because counting bones takes rules, and somebody has to choose them. Some people have extra tiny bones, called sesamoids, buried inside their tendons, and they turn up in one person and not in the next. The kneecap is the biggest sesamoid of all. The technician slid a picture of a foot onto the light, and there, tucked under the big toe, sat a tiny round bone. Kwesi pressed his knee again. Is a bone still a bone if only some people have it? Anatomists had to decide, and 206 leaves the extras out.

Kwesi's X-ray went back into its envelope. "Around 206 in most adults," said the technician, "give or take." Bodies vary, she added: a few people have an extra rib up near the neck, and nobody thinks they are wrong. Kwesi held up his splinted finger and grinned. Here is something to try. The femur, the long bone of the thigh, is about a quarter of your height. Ask a grown-up to help you measure from your hip to your knee, and see how close you come.

## Questions

**1. Why is the answer to "how many bones?" not just one number?**

A. Babies have more bones that later fuse, and people count by different rules
B. Bones change shape every night
C. Nobody has ever counted

**2. What does marrow do?**

A. It makes blood cells
B. It holds joints together
C. It stores your sense of balance

**3. In this book, what does it mean that a bone "fuses"?**

A. It breaks in two
B. It grows together with another bone
C. It turns to cartilage

**4. What did Vesalius find that Galen had missed?**

A. The lower jaw is a single bone
B. The skull has no gaps
C. The femur is the smallest bone

**5. What makes the hyoid unusual among the bones of the body?**

A. It is the longest bone
B. It touches no other bone
C. It lives inside the ear

## Words to know

marrow: bone jelly
cartilage: bendy tissue
hyoid: neck bone
sesamoid: tendon bone

# Answer key: How Many Bones Are in the Human Body?

1. A. Babies have more bones that later fuse, and people count by different rules
2. A. It makes blood cells
3. B. It grows together with another bone
4. A. The lower jaw is a single bone
5. B. It touches no other bone