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# Human anatomy and physiology practical book pdf download

Most people can recognize cockroaches instantly. They're brown or black insects that are usually between half an inch and two inches long (12-50 millimeters), minus their long antennae. Their heads point downward, almost as if they're built for ramming. Males usually have wings, but females often don't. Those that do usually have vestigial wings -- small, undeveloped wings that often don't allow the roach to fly. Although their reputation often sets them apart, roaches have a lot in common with other insects. Their bodies have three primary regions -- the head, the thorax and the abdomen. They have three pairs of jointed legs, one pair of antennae and a rigid exoskeleton. Roaches shed their exoskeleton, or molt, several times during their lives. After molting, most roaches are white and easily injured until a hormone called bursicon causes the exoskeleton to darken and harden. Sometimes, a roach can re-grow a lost limb when it molts and even put off molting to allow the new limb to grow. Roaches' heads house their eyes, antennae and mouthparts. Contrary to popular perception, their heads also house their brains. However, much of their nervous system activity takes place in nerve ganglia located throughout their bodies. This is one of the reasons why a headless roach can live for more than a week. The other is that roaches don't breathe through a nose or mouth. Instead, they draw air through spiracles, or holes in their sides. Tubes called tracheae deliver oxygen from the spiracles to organs and tissues. When a headless roach finally dies, it dies of thirst. Although not as distinctive as the eyes of dragonflies or houseflies, cockroaches' eyes are compound and are made of photoreceptor cells called ommatidia. A hard ring called the ocular sclerite surrounds the photoreceptors. Because of this compound structure, cockroaches see the world as a mosaic. Movable antennae, also known as antennal flagella, allow roaches to feel and smell the world around them. Although the antennae look like threads, they're really made of lots of tiny, hair-covered segments. These segments are shorter and thicker near the roach's head, and they're longer and thinner near the tips. Roaches' mouths, like those of other insects, are significantly different from mammals' mouths. However, many mouthparts serve the same function as parts of a mammal's mouth: The labrum and labium form lips. Two mandibles have cutting and grinding surfaces like teeth. Two maxillae manipulate the food while the roach chews. A roach's thorax houses the attachments for three pairs of legs and, if the roach has them, two pairs of wings. Each of the three pairs of legs is named after the region of the thorax to which it attaches: The prothoracic legs are closest to the roach's head. These are the roach's shortest legs, and they act like brakes when the roach runs. A portion of the prothorax also covers the roach's head. The middle legs are the mesothoracic legs. They move back and forth to either speed the roach up or slow it down. The very long metathoracic legs are the roach's back legs, and they move the roach forward. Using its metathoracic legs, a roach can move about 50 body lengths in a second. A human moving that quickly would be running about 200 miles per hour. When a roach runs this quickly, it sometimes raises up and runs on its back legs only. The force of the air it encounters keeps it upright. These three pairs of legs have substantially different lengths and functions, but they have the same parts and move the same way. The upper portion of the leg, called the coxa, attaches the leg to the thorax. The other parts of the leg approximate parts of a human leg: The trochanter acts like a knee and lets the roach bend its leg. The femur and tibia resemble thigh and shin bones. The segmented tarsus acts like an ankle and foot. The hook-like tarsus also helps roaches climb walls and walk upside down on ceilings. Each leg moves up and down like a pogo stick and back and forth like a pendulum. The front and back legs on one side move at the same time as the middle leg on the other side. In this way, the roach can move over nearly any terrain. When a roach is running as fast as it can, its legs move back and forth about 27 times per second. When it runs upside down on a ceiling, it takes longer steps in an attempt not to fall down. In fact, it takes significantly more energy for a roach to run upside down than to run up a vertical wall. The Abdomen Most insects have a segmented abdomen that contains most of their internal organs, and roaches are no exception. Inside a roach's abdomen, a tube-like heart moves blood to organs and tissues. Unlike human blood, a roach's blood doesn't use hemoglobin to carry oxygen, so it is colorless instead of red. The blood also doesn't travel through an extensive circulatory system. Although an aorta carries blood to specific organs, much of the blood travels through a network of spaces called a hemocoel. Roaches also store fat a little differently than people do. Instead of spreading it throughout most of their physical structure, they store it in one centralized location called the fat body. A roach's digestive system is located in its abdomen, and much of it resembles a simplified version of a mammal's digestive system. However, a roach's digestive system has a few modifications that let it eat cellulose and other tough materials. One of these is a crop, which holds swallowed food until a toothy section of the digestive tract, called the proventriculus, can pulverize it. Sacs called the gastric caeca hold enzymes and microbes that continue to digest the food. This extra digestive help is particularly important if the roach eats cellulose or wood. Only after the material is thoroughly broken down can the roach's midgut absorb the food's nutrients. Two segmented cerci lie on the exterior of the lower part of a roach's abdomen. These somewhat resemble antennae, and they can behave as sensory organs. A nerve inside the roach allows it to detect air movement around its cerci. This is one reason roaches can move out of the way very quickly if you try to catch or crush them. Roaches' reproductive systems are also located in their abdomen. We'll look at this system and at the cockroach life cycle next. Anatomy is the study of body parts. Physiology is the study of how these parts function and work together to sustain life. Educators who specialize in teaching these topics are known as anatomy and physiology teachers, and they may teach at the high school or post-secondary level. To become an anatomy and physiology teacher, you must meet certain education and certification requirements. An undergraduate education is essential for all anatomy and physiology teachers. Educators must have at least a bachelor's degree to teach high school or college students. Most aspiring anatomy and physiology teachers choose to complete a teacher preparation program that allows them to major in science, biology or a related content area. Programs like this typically include coursework in education, child psychology, curriculum development, teaching methods, anatomy, physiology, biology and general science. Some states require anatomy and physiology teachers to have a master's degree to teach at the high school level. A master's degree may also be required to instruct at community colleges. Educators who would like to teach anatomy and physiology at four-year colleges or universities usually need a doctoral degree in their field. Some post-secondary institutions also prefer professors to have some previous work experience. This experience could be gained by working as a teaching assistant, high school teacher, researcher or healthcare professional. If you hope to teach anatomy and physiology at a public high school, you will need to be licensed by the state you plan to teach in. Licensing, also known as teacher certification, qualifies you to teach students in the 7th through the 12th grades. Certification rules vary by state, but typically require passing a general examination as well as a subject exam that tests your knowledge of science, anatomy and physiology. To encourage more people to become teachers, all states offer alternative routes to certification. These routes are designed for individuals who have a bachelor's degree in an area other than education or teaching. Although alternative certification programs can vary by state, they usually include some instruction in teaching methods and child development, and may include a student teaching experience under the supervision of a more experienced and fully certified teacher. By Chron Contributor Updated October 02, 2020 Professionals who work in anatomy and physiology careers deal with the body and its parts and functions. There are various jobs related to anatomy and physiology, as these subjects are the basis for medicine, forensic science, therapy, pharmaceutical industries and biomedical research. Depending on the job, anatomy and physiology careers can require relatively few years of schooling or many years of rigorous study. Doctors diagnose and treat diseases and injuries. They analyze patients, review their medical histories, recommend medications, and conduct and analyze diagnostic tests. Surgeons conduct operations to treat injuries and diseases. Physicians sometimes get further training and specialize in fields such as anesthesiology, family medicine, pediatrics, dermatology, obstetrics or gynecology. The Medscape Physician Compensation Report 2019 lists earnings by specialty. Salaries range from an average of \$236,000 for specialists in diabetes and endocrinology to an average of \$482,000 for orthopedic surgeons, making physicians who specialize the highest paid among jobs related to anatomy. Typically, doctors first earn a bachelor's degree in life science, one of the undergraduate majors that require anatomy and physiology. Aspiring physicians then attend four years of medical school, and complete three to eight years of internship and residency training. They also must pass the U.S. Medical Licensing Examination to be licensed. The annual median pay for physicians and surgeons was \$208,000 as of 2019, according to the U.S. Bureau of Labor Statistics. Median salary means half in the profession earned more, while half earned less. Registered nurses manage and give patient care. They record observations about patients, provide medicines and treatment, carry out doctor's orders, assist in conducting diagnostic tests, and educate patients and their families about disease management. Nurses can have specializations to become an addiction nurse, cardiovascular nurse, critical care nurse, genetics nurse, neonatology nurse, nephrology nurse, rehabilitation nurse and advanced practice registered nurse. Aspiring RNs can pursue a diploma from an accredited nursing program, or an associate's or bachelor's degree in nursing. Both are majors that require anatomy and physiology courses. Diploma programs typically offer hands-on training and are associated with a hospital or medical facility. Most nurses pursue the bachelor's degree, which offers more in-depth studies of the sciences and leadership, along with all of the requirements of the associate's degree and diploma programs. Registered nurses are also required to have a license by passing the National Council Licensure Examination. The median annual salary of registered nurses was \$73,300 in 2019, according to the U.S. Bureau of Labor Statistics. Occupational therapists help patients recuperate and improve skills necessary for daily living and working. They establish treatment plans using observations about their patients. This includes activities with specific goals the patient needs to accomplish. Occupational therapists may also check their patients' home or workplace to determine necessary modifications that will aid recovery and daily activities. They also educated their patients' family members and employers about ways to care and assist the patients. Occupational therapists must have a master's degree, and although certification is not required, they sometimes take the National Board for Certification of Occupational Therapists exam. Based on BLS reporting, the annual median wage they earned was \$72,320 in 2010. Physical therapists help rehabilitate and treat patients with chronic injuries or conditions. They help patients recover, manage pain and improve their movement. Their duties include diagnosing the patient's dysfunctional movements, creating treatment plans, using exercises, hands-on therapy and equipment. Physical therapists teach patients and their families about expectations and guide them with coping strategies during the recovery period. They must earn a doctorate in physical therapy, complete a residency program and pass the National Physical Therapy Examination. According to the U.S. Bureau of Labor Statistics, their annual median wage was \$84,950 in 2019. Paramedics primarily provide care to patients during an emergency situation. They respond to 911 calls, determine the patient's condition and plan a course of treatment. They ensure their patients' safety during transport and transfer to the emergency room, and report their observations to the medical staff. In addition, they must make reports containing information about all the medical care they provided their patients. Paramedics must have a high school diploma and cardiopulmonary resuscitation certification. They can complete formal training in emergency care at community colleges or technical institutes. Additionally, they must get certification through the National Registry of Emergency Medical Technicians. The U.S. Bureau of Labor Statistics reported a median 2019 salary for paramedics and emergency medicine technicians (EMTs) as \$35,400. In this anatomy course, part of the Anatomy XSeries, you will be introduced to the central and peripheral nervous systems. You will learn about basic neuroanatomy, sensory pathways, motor pathways and the autonomic nervous system. The course includes illustrated lecture videos and quizzes to help you expand and test your knowledge of the nervous system. By the end of this course, you will have a better understanding of how the entire body influences, and is influenced, by the nervous system. Learn the gross anatomy of the central and peripheral nervous systems Understand how sensory information enters the brain Understand how the brain and spinal cord control the muscles Understand how the autonomic nervous system activates the fight or flight response Learn the names and functions of the cranial nerves Receive an instructor-signed certificate with the institution's logo to verify your achievement and increase your job prospects Add the certificate to your CV or resume, or post it directly on LinkedIn Give yourself an additional incentive to complete the course! 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