

What your student will study in Biology 30

What the course covers

The nervous system and homeostasis

Your student will learn how the nervous system keeps the body in balance. It does this by sensing changes in the environment. Then it triggers the right response. The course covers neuron structure. It also covers how nerve impulses form and travel along neurons. Students study chemicals like acetylcholine and norepinephrine. These chemicals work at synapses, where neurons communicate with each other. Your student will study the central nervous system. This includes the brain and spinal cord. Your student will also study the peripheral nervous system, which is nerves that extend throughout the body. These systems control voluntary movements. They also control involuntary functions like heart rate and digestion. A key focus is reflex arcs. Reflex arcs let the body respond quickly to danger. This happens without waiting for the brain to process information. Your student will also examine sensory systems in detail. This includes the structure and function of the eye, ear, and other sensory receptors. These receptors let humans see, hear, smell, taste, and feel their surroundings. Laboratory work includes observing neurons under a microscope. It also includes investigating reflex responses. Students measure visual acuity and hearing range. They also design experiments to test how the body responds to touch, temperature, and pressure. [See the curriculum: 1, 2, 3, 4, 5, 6, 7.](#)

The endocrine system and hormonal regulation

Your student will learn how hormones released by endocrine glands regulate body functions. Hormones help maintain homeostasis. The course identifies the major endocrine glands. These are the hypothalamus and pituitary complex, thyroid, parathyroid, adrenal glands, and pancreas. Students learn the specific hormones each gland produces. They also learn the role of these hormones in the body. Your student will understand how thyroid hormone controls metabolism. They will learn how insulin and glucagon regulate blood sugar. They will learn how growth hormone influences development. They will also learn how the adrenal glands respond to stress. A central theme is feedback. This means how the body detects when hormone levels are too high or too low. The body then adjusts production to restore balance. Your student will compare nervous and endocrine control. Both systems work together. For example, stress triggers nervous system activation. Stress also triggers release of cortisol and epinephrine from the adrenal glands. The course also examines what happens when hormones are out of balance. Diabetes is used as a primary example. Students explore how the endocrine system contributes to homeostasis. Laboratory investigations include analyzing blood and urine composition. This helps infer the roles of specific hormones. Students use computer simulations to model insulin regulation. They also research conditions like seasonal affective disorder. [See the curriculum: 1, 2, 3, 4, 5, 6, 7.](#)

How the course is assessed

Your student will be assessed in several ways. These include investigations into relationships between observable variables. They also include experiments to investigate the physiology of reflex arcs. Students make observations using microscopes and models. They also compile and display data collected from investigations. The course requires students to gather and record data and information. Students use a broad range of tools and techniques. They compile and display data in an appropriate format. This unit represents about 25 percent of the total Biology 30 course time. [See the curriculum.](#)

How to support study at home

Talk through how systems work. Ask your student to explain how a reflex arc works. For example, how does the hand pull away from a hot stove without conscious thought? Ask how insulin brings blood

sugar back to normal after eating. These conversations help your student move from memorizing structures to understanding function. [See the curriculum: 1, 2.](#)

Review diagrams and label structures together. Neuron diagrams, brain anatomy, and endocrine gland locations appear often in assessments. Spend time with your student observing the structure of neurons and myelin sheaths. Use models, computer simulations, or dissections. Have your student identify and explain how an action potential forms and travels. This includes the all-or-none response and intensity of response. Students should understand how a signal crosses a synapse. They should know the main chemicals and transmitters involved: norepinephrine, acetylcholine, and cholinesterase. [See the curriculum: 1, 2, 3, 4.](#)

Work through data interpretation. Biology 30 requires your student to read graphs and tables. These may show hormone levels, blood composition, or experimental results. Your student must then draw conclusions. Ask your student to describe what a graph shows: "What happens to insulin levels after a meal?" or "How does ADH change when the body loses water?". [See the curriculum: 1, 2.](#)

Connect concepts to real life. When your student learns about the stress response, discuss what happens in the body during an exam or athletic competition. When studying diabetes, ask how understanding insulin explains why some people need injections. Others manage the condition with diet. These links make abstract concepts concrete. [See the curriculum: 1, 2, 3.](#)

Encourage questions about medical technologies. Your student will learn about technologies that correct sensory defects, such as glasses and hearing aids. They will also learn about technologies that treat hormonal disorders, such as insulin pumps and growth hormone therapy. Ask your student to research one technology. Have them explain how it works based on the physiology learned in class. [See the curriculum: 1, 2.](#)

Support laboratory notebook organization. Make sure your student records observations clearly. Notebooks should include labeled diagrams. Conclusions should connect data to the concepts being tested. Compiling and displaying data in an appropriate format shows understanding of investigations [See the curriculum: 1, 2, 3.](#)

Note: 92 learning outcome blocks were left out to fit the 6000-token curriculum budget for this kind of material. Use "Split into parts" to generate one document per organizing idea.