

Answers from CK-12 Life Science For Middle School Teacher's Edition
<http://www.ck12.org/saythanks>

Day 2

1. Organisms are living things.
2. All living organisms need energy and resources to carry out life processes; are composed of one or more cells; respond and adapt to their environment; reproduce and grow and develop.
3. All animals must eat plants or other animals in order to obtain energy and building materials. Plants use energy from the sun to make their "food" through the process of photosynthesis. Mushrooms and other fungi obtain energy from other organisms.
4. Cells are the smallest unit of living things.
5. Answers will vary. Fire does not have qualities of living organisms.

Day 3

1. The integumentary system is the organ system that includes the skin, hair, and nails.
2. The cells at the bottom of the epidermis are always dividing by mitosis to form new cells. The new cells gradually move up through the epidermis toward the surface. As they move, they produce tough, fibrous keratin. By the time the cells reach the surface, they have filled with keratin and died. The dead cells are gradually shed from the surface of the epidermis and replaced by other dead cells that move up from below.
3. Answers may vary. Sample answer: Three functions of the skin are preventing loss of water from the body, keeping microorganisms out of the body, and helping maintain a constant body temperature.
4. Sebaceous glands secrete oily sebum, which spreads out over hairs and the skin surface. The sebum waterproofs the hair and skin and helps to prevent them from drying out. Sweat glands secrete salty sweat, which spreads out over the skin surface. When the sweat evaporates, it takes some of the heat from the body, so it helps keep the body cool.
5. Any cut to the skin that penetrates the dermis is likely to be painful because there are many nerve endings in this layer of the skin. Hair and nails consist only of dead cells, so cutting them does not cause any pain.
6. The epidermis is the outer layer of skin. It consists almost entirely of epithelial cells. The only skin structures it contains are melanocytes, which are cells that produce melanin. The dermis is the inner layer of skin. It consists of connective tissue. It also contains most skin structures, including blood vessels, nerve endings, hair follicles, and sebaceous and sweat glands.
7. Melanocytes are special cells at the bottom of the epidermis that produce the brown pigment called melanin. Melanin in the epidermis absorbs ultraviolet light so it can't reach the dermis and damage this layer of skin and its structures.

Day 5

1. Muscles are the main organs of the muscular system. They are composed primarily of long, thin cells called muscle fibers. Muscle fibers contain many organelles, known as myofibrils, which allow muscles to contract.
2. Tendons are tough connective tissues that anchor skeletal muscles to bones throughout the body. When the muscles contract, they pull on the bones to which they are attached by tendons, and this allows movement.
3. Public service announcements may vary but should argue convincingly and correctly why regular exercise is important for healthy muscles.
4. Within myofibrils of a muscle's muscle fibers, myosin filaments use energy from ATP to pull on actin filaments. This causes the actin filaments to slide over the myosin filaments and shorten sections of the myofibrils. This process occurs all along many myofibrils and in many muscle fibers, causing the fibers to shorten and the muscle to contract.
5. Sample answer: The three types of muscle tissues are cardiac, smooth, and skeletal muscle tissues. All three types consist mainly of cells called muscle fibers, but their arrangement differs. In cardiac and skeletal muscle tissues, the muscle fibers are arranged in bundles, causing these muscle tissues to be striated, or striped. In smooth muscle tissue, the fibers are arranged in sheets rather than bundles, so smooth muscle tissue is not striated. The three types of muscle tissues differ in how they are controlled. Skeletal muscle tissue is under conscious control. Cardiac and smooth muscle tissues are not under conscious control. The three types of muscle tissues also differ in where they are found. Cardiac tissue is found only in the walls of the heart. Smooth muscle tissue is found in the walls of other internal organs such as the stomach. Skeletal muscle tissue is attached to bones of the skeletal system.
6. Muscles can only contract. They can't actively lengthen. Therefore, to move bones back and forth at joints, skeletal muscles must work in pairs. For example, the bicep and triceps muscles of the upper arm work as a pair. When the bicep muscle at the front of the upper arm contracts, it bends the arm at the elbow. When the triceps muscle at the back of the upper arm contracts, it straightens the arm.