

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

Day 25

1. Blood is a liquid tissue that consists of watery plasma and three types of blood cells.
2. The main function of blood is transporting substances to cells throughout the body.
3. Answers may vary. Sample answer: Two diseases of the blood are anemia and leukemia. Anemia is a disease that occurs when there is not enough hemoglobin (or iron) in the blood to carry adequate oxygen to cells. Possible causes of anemia include excessive blood loss and lack of iron in the diet. Leukemia is a type of cancer in which bone marrow produces abnormal white blood cells that can't fight infections. Leukemia is thought to be caused by a combination of genetic and environmental factors.
4. Sample answer: It might be necessary to determine your ABO blood type if you needed a blood transfusion because of an injury or surgery. It is safe to receive a transfusion only if the donated blood lacks the same antigens that your own blood is lacking.
5. If you have type O blood, you can safely receive only type O blood. The other blood types (A, B, and AB) have antigens not found in your blood. Receiving blood of these types would cause your red blood cells to clump together, or agglutinate.
6. Red blood cells are more numerous than white blood cells. Red blood cells are disc shaped, whereas white blood cells are sphere shaped. Red blood cells carry oxygen in the blood, whereas white blood cells defend the body.
7. Antigens are proteins on the surface of red blood cells. The particular antigens on the cells determine a person's blood type. For example, a person with A antigens on their red blood cells has blood type A in the ABO blood type system.

Day 27

1. The cardiovascular system consists of the heart, a network of blood vessels, and blood.
2. The main function of the cardiovascular system is transporting substances throughout the body. Another function of the cardiovascular system is helping to regulate body temperature.
3. Answers may vary. Sample answer: I think a highway system is a good analogy for the cardiovascular system because both a highway system and the cardiovascular system have the main purpose of transporting materials from one place to another. Blood vessels are also like the roads of a highway system. Both blood vessels and roads provide a network of pathways for the transport of materials.
4. Both pulmonary and systemic circulation loops are part of the closed network of heart and blood vessels that make up the cardiovascular system. As blood circulates through the body, it travels first through one loop and then the other loop, over and over again. The pulmonary loop, which is shorter, carries blood back and forth between the heart and lungs, where the blood picks up

oxygen. The systemic loop, which is longer, carries blood back and forth between the heart and the rest of the body, where blood releases oxygen to cells.

Day 31

1. The function of the respiratory system is to exchange gases with the outside air. It brings air containing oxygen into the body for the cells. It also releases carbon dioxide from the cells into the air.
2. Respiration is the process of exchanging oxygen and carbon dioxide with the air. It involves breathing and transport of gases in the blood to and from cells. Cellular respiration is the “burning” of glucose for energy inside cells. It requires oxygen and produces carbon dioxide. These gases are exchanged between cells and blood and between blood and air in the process of respiration.
3. Steps in the process of respiration include breathing (inhaling and exhaling), gas exchange between the air and blood, gas transport via the blood, and gas exchange between the blood and cells.
4. Asthma is a disease in which bronchioles in the lungs periodically swell and fill with mucus. Symptoms of asthma may include difficulty breathing, wheezing, coughing, and chest tightness. An asthma attack may be triggered by allergies, strenuous exercise, stress, or another respiratory illness such as a cold.
5. Posters will vary but should be relevant to teens and correctly identify dangers of smoking to respiratory system health, such as triggering asthma attacks and causing emphysema and lung cancer.
6. Inhaling occurs when the diaphragm contracts. This increases the size of the chest, which decreases air pressure inside the lungs. The difference in air pressure between the lungs and outside air causes air to rush into the lungs. Exhaling occurs when the diaphragm relaxes. This decreases the size of the chest, which increases air pressure inside the lungs. The difference in air pressure between the lungs and outside air causes air to rush out of the lungs.
7. The function of the lungs is to exchange oxygen and carbon dioxide between the blood and the air. The alveoli in the lungs are where this gas exchange takes place. Each alveolus is surrounded by a network of capillaries. When you inhale, air in the alveoli has a greater concentration of oxygen than does capillary blood. The difference in oxygen concentration causes oxygen to diffuse from the air in the alveoli into the blood in the capillaries. Carbon dioxide, in contrast, is more concentrated in the capillary blood than it is in the air in the alveoli. It diffuses in the opposite direction. It moves out of the blood and into the air in the alveoli.