1. If you lay your ear against a pillow, you can often hear your heart beat. Explain what heart beat is, including: (A) how it relates to the three steps of the cardiac cycle (one of the step we can't hear) and (B) the movement of blood through the heart's chambers.
   My answer: A. | B. the deoxygenated blood comes into the right atrium. The atrium moves the blood into the right ventricle and out into the pulmonary artery. The pulmonary artery pushes the blood into the lungs so that the blood cells can by oxygenated. The blood with oxygen from the lungs goes into the pulmonary veins and into the left atrium. The left atrium pushes blood into the left ventricle and out of the aorta. The aorta will push the blood towards the organs.
   Better answer: The "lub-DUB" sound is made by the valves in the heart closing. Step 1. Atria fill with blood returning to the heart via veins (superior vena cava from body low [O2] & Pulmonary vein from lungs high [O2]) Step 2. Atria contract and push blood down into the Ventricles, Step 3. Ventricles contract and push blood out of the heart (Pulmonary Artery to lungs low [O2], Aorta to body high [O2]). Diastole or diastolic pressure is the constant and lowest pressure on the system, the lower # in blood pressure measurements, this is when the atria are filling with blood returning to the heart. Systole or systolic pressure is the pressure on the system when the heart contracts and pushes blood out through arteries to the lungs (pulmonary circulation) and the rest of the body (systemic circulation). This is the higher number in blood pressure measurements.

2. Imagine you are a red blood cell traveling through the body. List the five types of vessels you travel through after leaving the left ventricle of the heart, reaching the toes and then moving back to the heart. Include the structural differences between the arteries, capillaries, and veins as well as when the you (as a red blood cell) are carrying the most and least oxygen on this journey.
   My answer: The five vessels are arteries, arterioles, capillaries, venules, and veins. An artery is a large vessel that leaves the heart (from the aorta) to the lungs. The arterioles leads to the capillary. The capillary tissue walls are so small, it allows carbon dioxide to enter the blood cells and have the oxygen leave the blood cells. This is called gas exchange. The blood cells then travel through the venule, which goes into the veins. The veins carry blood with low oxygen into the heart, specifically the vena cava.
   Better answer: 1) Artery (carry blood away from heart), highest blood pressure, thickest walls. If in the systemic circulatory loop, the [O2] is high, [CO2] is low; 2) Arteries branch into Arterioles which are smaller arteries, still under high pressure, but a bit lower than the main Arteries, still thick walled, but a bit thinner, [O2] still high, CO2] is low; 3) Arterioles branch into capillaries which are very small in diameter (once RBC in diameter) and their walls are only one cell thick. This is where gas and nutrient exchange takes place with cells. O2 (and nutrients) is dropped off and CO2 (and wastes) is picked up; 4) Capillaries come together in Venules, which are under low pressure, [O2] is low [O2] is high, the walls of venules are thin; 5) venules come together into Veins. Veins are under the lowest pressure, they have thin walls, and they have valves to help keep the blood flowing in one direction, back to the heart. The [O2] is low [O2] is high.

3. Which of the blood types is the "universal acceptor" meaning that individuals with that blood type can accept all of the blood types (including Rh factor)?Which blood type is the universal donor, meaning every blood type can use their blood? Describe what would happen if you mistakenly gave the "universal acceptor's" blood to the "universal donor."
   My answer: The universal acceptor blood type is the AB+ (AB positive) and the universal donor blood type is O- (O negative). Usually, if a body is given blood that it does not recognize, it will create antibodies to attack the unknown blood type. This situation creates a big glob of blood.
   Better answer: The "universal acceptor" blood type is AB+ because it has all three of the surface protein types (A, B, and Rh factor) on the surface of the red blood cells (RBCs) and therefore AB+ individuals do not produce antibodies against any of the surface proteins, so they can receive any blood type and their bodies will not react against it. The "universal donor" blood type is O-, meaning the RBCs have none of the surface proteins (A,B, nor Rh), therefore there is nothing for a recipient to react against. If the blood of a "universal acceptor" (AB+) was given to a "universal donor" (O-), the "universal donor" would produce antibodies against all three of the surface proteins (A, B, and Rh) on the "universal acceptors" RBCs. Massive clotting (agglutination) would result if blood types are mismatched.

4. Provide three examples of aerobic exercises you can personally do and three positive impacts of aerobic exercise can have on your heart.

My answer: I could ride a bike, play basketball, or run. Some benefits are that it increases the oxygen available to heart cells, increase the volume of blood pumped, and reduces heart rate.