**Blood Flow Review Sheet**

**SC.912.L.14.36: Describe the factors affecting blood flow through the cardiovascular system.**

**Blood flow** refers to the movement of blood through a vessel, tissue, or organ, and is usually expressed in terms of volume of blood per unit of time. It is initiated by the contraction of the ventricles of the heart. Ventricular contraction ejects blood into the major arteries, resulting in flow from regions of higher pressure to regions of lower pressure, as blood encounters smaller arteries and arterioles, then capillaries, then the venules and veins of the venous system. There are a number of variables that contribute to blood flow throughout the body.

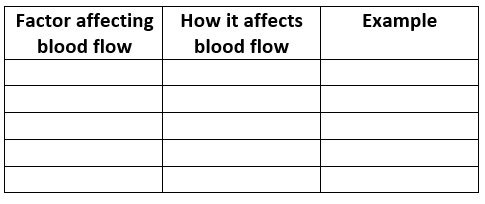
**Blood pressure** is force exerted by blood upon the walls of the blood vessels or the chambers of the heart. Blood pressure may be measured in capillaries and veins, as well as the vessels of the pulmonary circulation. The term blood pressure typically refers to the pressure of blood flowing in the arteries of the systemic circulation. In clinical practice, this pressure obtained using the brachial artery of the arm.

The relationship between **blood volume**, blood pressure, and blood flow is obvious. Water may merely trickle along a creek bed in a dry season, but rush quickly and under great pressure after a heavy rain. Similarly, as blood volume decreases, pressure and flow decrease. As blood volume increases, pressure and flow increase.

**Viscosity** is the thickness of fluids that affects their ability to flow. Clean water, for example, is less viscous than mud. The viscosity of blood is directly proportional to **resistance** and inversely proportional to flow; therefore, any condition that causes viscosity to increase will also increase resistance and decrease flow. For example, imagine sipping milk, then a milkshake, through the same size straw. You experience more resistance and therefore less flow from the milkshake. Conversely, any condition that causes viscosity to decrease (such as when the milkshake melts) will decrease resistance and increase flow.

**Exercise** has a number of effects that benefit the heart and circulation (blood flow throughout the body) including, helping to keep blood vessels flexible and open.

There are many diseases that can affect the heart and its tissues. **Disease** can interfere with the proper flow of blood through the cardiovascular system in several ways. It can clog arteries, or impede blood flow, which can impede many bodily functions, including breathing and respiratory issues. The older you are, the more vulnerable you are to cardiovascular (heart) disease.



1. The rate at which blood flows through the human body changes in response to many factors. Which statement describes one of these factors and its effect on blood flow?
   1. A high viscosity of blood causes an increased resistance in the blood vessels and leads to slow blood flow.
   2. A low blood pH decreases the rate of diffusion through the blood vessels and leads to slow blood flow.
   3. The changing of the shape of red blood cells to a crescent shape decreases resistance and lead to a faster blood flow.
   4. The narrowing of blood vessels increases pressure and leads to a faster blood flow.
2. Cardiovascular disease runs in Jim’s mother’s family. Jim is only 17 but knows that his mom and grandparents all have high blood pressure. Which of the following best describes the connection between cardiovascular disease and age?
   1. As people age, their blood vessels become more elastic leading to less cardiovascular disease.
   2. As people age, the heart becomes more efficient with each pump, increasing cardiac output.
   3. As people age, blood pressure decreases leading to more cardiovascular disease.
   4. As people age, plaque builds up in the arteries increasing vessel resistance, which leads to disease.
3. Jim was told that he might need to go on medication if his blood pressure continues to be high. What causes blood pressure?
   1. cholesterol in the blood
   2. stress that exercise puts on heart muscle
   3. contraction of the ventricles in the heart
   4. removal of oxygen from the blood