Introduction to Blood Pressure

The animal cardiovascular system transports oxygen and other nutrients to all cells and carries carbon dioxide and other waste products away. Various factors can affect the rate of circulation.

In this activity, you will:
- Learn to take pulse and blood pressure in a human subject

Background: Blood Pressure and Pulse

Blood moving through the blood vessels exerts pressure against the vessel walls. This blood pressure is highest in the aorta. It decreases as the blood moves through the arterioles, capillaries, venules, and veins.

With each contraction of the heart, you can feel the expansion and recoil of the elastic arteries where they pass near the surface of the skin. This is the pulse. When you take your pulse, you measure heart rate – the number of times the heart contracts per minute.

Blood Pressure

As you have read, blood pressure is a measure of the pressure of the blood against the walls of a blood vessel. Clinically, blood pressure is usually measured in the brachial (arm) artery, so our discussion will focus on this specific location.

There are two components to blood pressure:

- **Systolic pressure**: The pressure in the artery during the ventricular contraction phase of the heart cycle. The pressure in the vessel is highest at this time.
- **Diastolic pressure**: The pressure in the artery when the ventricles are relaxed. The pressure is at its lowest point, though it does not drop all the way to zero.

Next we will learn how blood pressure is measured.

Understanding Blood Pressure

When we measure blood pressure, we are actually measuring the systolic pressure and the diastolic pressure separately. This is why you always see blood pressure reported as two numbers, one "over" the other. For example:

In a blood pressure reading of 110/80,

- 110 = systolic pressure
- 80 = diastolic pressure

The numbers refer to the number of millimeters the pressure will raise a column of mercury. The blood pressure of teenagers is frequently in the range of 120/70.
**Measuring Blood Pressure**
We find the blood pressure by using an instrument called a sphygmomanometer (pronounced sfig-mo-muh-NAM-eh-ter). This device consists of an inflatable cuff that is wrapped around the upper arm and a gauge that measures pressure. A stethoscope is used to listen to the different sounds that occur.

**Procedure for Measuring Blood Pressure**

1. You begin by inflating the cuff. Once the pressure in the cuff is above the subject's systolic pressure (140 in this example), blood cannot flow below the cuff. You will hear no sound in the brachial artery when you listen with the stethoscope.

2. As you release the pressure valve and slowly deflate the cuff, blood begins to flow through the artery.

3. When the pressure in the cuff is between the systolic and diastolic pressure, you can hear a tapping sound with each pulse. The first tapping sound you hear indicates that blood has entered the artery. Record this reading as the systolic pressure. You continue to deflate the cuff until the tapping sounds cease.

4. The last tapping sound you hear indicates the diastolic pressure.

**Measuring Pulse**
As you have seen, a pulse is measured as the distention of an artery that can be felt each time the heart contracts. Pulse is measured in number of beats per minute. You can measure pulse anywhere an artery passes close to the skin. Clinically, it is most common to measure heart rate in the radial artery on the inside of the wrist. The figure below shows you the procedure.

1. Place your index and middle fingers in the groove on the inside of the wrist. Just slide your fingers across the tendons until they slip into soft tissue.

2. Wait until you clearly feel beats coming with a regular rhythm.

3. Count the number of beats for 15 seconds and multiply by 4 (or for 30 seconds and multiply by 2) to get the number of beats per minute.