The Doppler Effect

-If the sound source and the listener both stand still, the listener will observe the same frequency as the frequency of the sound waves produced by the stationary source.
-If a power source moves to a stationary listener, or if the listener moves to the stationary power source, the frequency of the sound waves heard by the listener will increase.
-If a power source moves away from the listener, the frequency of the sound waves heard by the listener will decrease.

The Doppler effect is the frequency shift that is observed when the power source and the listener move with regards to eachother. While they approach eachother the frequency is higher and while they move further apart the frequency is lower than observed when they are both stationary.

The frequency of a sound wave is the amount of compressions that passes a given point in one second.

The pitch of a sound wave relates with the frequency. The higher the frequency of the sound wave, the higher the pitch.

Speed of sound — Speed of listener

Frequency of listener — $f_L = \frac{V \pm V_L}{V \pm V_S} f_S$ — Frequency of source

Speed of source

Applications of the Doppler effect to find parts where blood vessels are constricted

Doppler flow meter: ultrasonic sound is a longitudinal wave to determine the speed of blood flow. An appliance consisting of a sender an a receiver is placed directly on the skin. The sender sends out a sound wave with a frequency that is reflected from a moving red blood cell. When the sound is reflected, the frequency changes due to the Doppler Effect, because cells move. The receiver receives the reflected sound and an electronic counter measures the frequency, what Doppler shifts is relative to the sent frequency. The shift in this frequency can be used to determine the speed of blood.

-Parts where blood vessels are constricted: any constriction in the blood vessels due to fat deposits/ hardened calcium lets the blood flow quicker. A Doppler flow meter detects the reflected sound of blood that moves in the blood vessels or arteries. The change in speed is detected as a change in pulse frequency. Excessive fat deposits and hardened calcium are warnings of a heart attack. Can also be used to monitor the movement of a newly formed fetus.