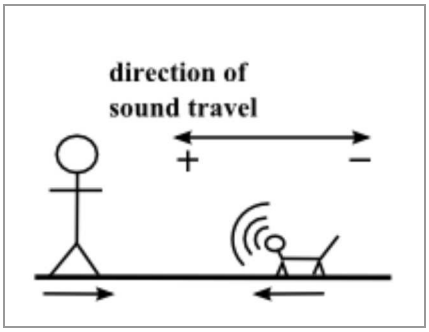
# The Doppler Effect (SwiftStudy Printable)

## Key Formula

$$f_o = f_s\left(\frac{v - v_o}{v - v_s}\right)$$

| | | |
|---|---|---|
| $f_o$ | observed frequency | Hz |
| $f_s$ | frequency of source | Hz |
| $v$ | speed of sound | m/s |
| $v_o$ | velocity of observer | m/s |
| $v_s$ | velocity of source | m/s |

## Tips to Remember




- In this formula, the key to success is following the sign conventions. The direction **that the sound travels** is always the positive direction; set the other velocities accordingly. For example, consider a problem in which a person and a barking dog run toward each other as shown at the right. The sound travels to the left, so everything moving left must have positive velocity, and vice versa. Therefore $v$ is positive (as always); $v_o$ is negative since the human obersever is moving right, and $v_s$ is positive because the dog (the sound source) is running left.
- It's always a good idea to make sure your answers make sense. Remember that when the source and observer are getting closer together, you expect the frequency to increase, i.e., $f_o > f_s$. Conversely, when the source recedes from the observer, expect a decreasing frequency, or $f_o < f_s$.