Masking & Critical Bands
- Frequency Selectivity
- Band-pass filters/Auditory filters
- Band-widening Experiment (Fletcher)
- Critical Bands
- Hearing loss & Critical Bands

Frequency selectivity in the cochlea is measured by studying masking (Fletcher, 1940). Masking is defined as the (1) process by which the threshold for one sound is increased by the presence of another sound and (2) the amount by which the threshold is increased by the presence of another sound expressed in decibels (ANSI, 1994).

In 1940, Fletcher suggested that the peripheral auditory system behaves as if it contained a bank of band-pass filters, which are termed auditory filters. He believed that the basilar membrane was responsible for the basis of the auditory filters in a way that each location of the basilar membrane responds to a limited range of frequencies, each region being a bandwidth.

In the band-widening experiment, he saw that an increase in noise bandwidth resulted in more noise passing through the auditory filters as long as the noise bandwidth is less than the filter bandwidth. These bandwidth regions at which the signal threshold did not increase any more were called critical bandwidths.

Each 1mm section of the cochlear basilar membrane responds to a corresponding range of frequencies, known as critical bands. At high frequencies, critical bands include a wider range of frequencies. When two tones that are different enough in frequency, they fall into two different critical bands and the auditory system is able to distinguish between the two. However, if the two tones presented are within the same critical band, the tone with the higher amplitude (higher intensity) will mask the other tone and make it inaudible, so the auditory system will only hear one of the ones.

Masking is used clinically when trying to determine the threshold for each individuals ear because it helps to rule out cross hearing. In people with hearing impairments, critical bands become wider making it more difficult to hear certain tones because they are masked out by background noise. Therefore, they have a harder time understanding speech in noise.