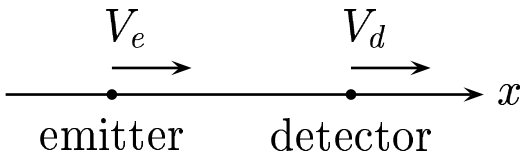
Consider the set up shown. Now the detector is accelerating, while the emitter is kept at a constant speed.




What will happen to the detected frequency?

A) increases.

B) stays the same.

C) decreases.

The detector is moving away from the sound waves.
So $v_{detected} = v_s - v_d$ .
The emitter is moving toward the detector.
So the detected wavelength is shortened,*i.e*,

$$\lambda_{detected} = \lambda_0 - v_e T = \frac{v_s - v_e}{f_0} .$$

So the detected frequency

$$f' = \frac{v_{detected}}{\lambda_{detected}} = \frac{v_s - v_d}{v_s - v_e} f_0 .$$

In turn, as the detector increases in its speed, $f'$ decreases.
Answer **C**

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