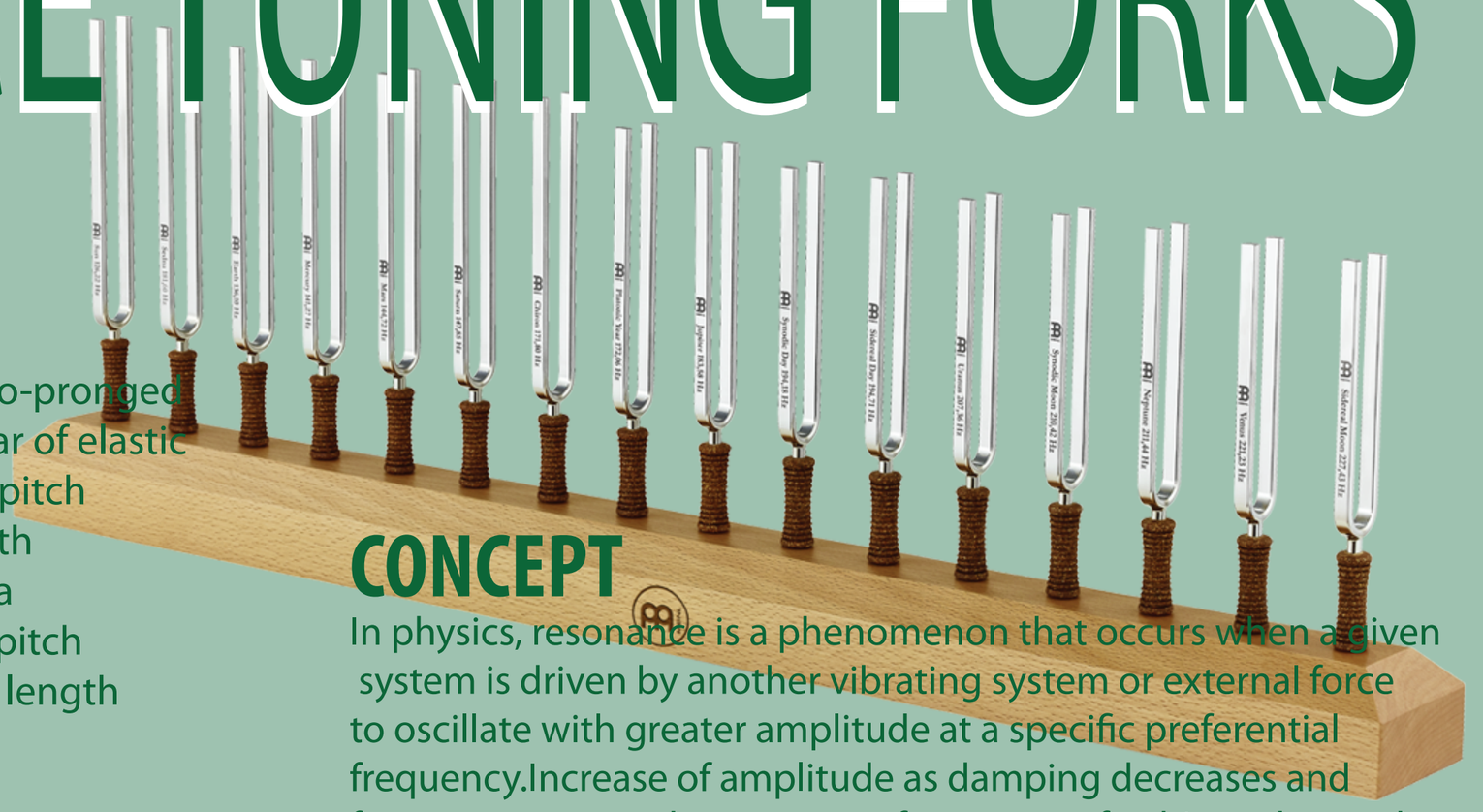
RESONANCE TUNING FORKS

LEVEL II



INTRODUCTION

Runing fork is an acoustic resonator in the form of a two-pronged fork with the prongs (tines) formed from a U-shaped bar of elastic metal (usually steel). It resonates at a specific constant pitch when set vibrating by striking it against a surface or with an object, and emits a pure musical tone after waiting a moment to allow some high overtones to die out. The pitch that a particular tuning fork generates depends on the length and mass of the two prongs. It is frequently used as a standard of pitch to tune musical instruments.

WHAT IS IT?

A tuning fork serves as a useful illustration of how a vibrating object can produce sound. The fork consists of a handle and two tines. When the tuning fork is hit with a rubber hammer, the tines begin to vibrate. The back and forth vibration of the tines produce disturbances of surrounding air molecules. As a tine stretches outward from its usual position, it compresses surrounding air molecules into a small region of space; this creates a high pressure region next to the tine. As the tine then moves inward from its usual position, air surrounding the tine expands; this produces a low pressure region next to the tine. The high pressure regions are known as compressions and the low pressure regions are known as rarefactions

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CONCEPT

In physics, resonance is a phenomenon that occurs when a given system is driven by another vibrating system or external force to oscillate with greater amplitude at a specific preferential frequency.Increase of amplitude as damping decreases and frequency approaches resonant frequency of a driven damped simple harmonic oscillator.Frequencies at which the response amplitude is a relative maximum are known as the system's resonant frequencies, or resonance frequencies.

At resonant frequencies, small periodic driving forces have the ability to produce large amplitude oscillations.

This is because the system stores vibrational energy.

Resonance occurs when a system is able to store and easily transfer energy between two or more different storage modes (such as kinetic energy and potential energy in the case of a pendulum). However, there are some losses from cycle to cycle, called damping. When damping is small, the resonant frequency is approximately equal to the natural frequency of the system, which is a frequency of unforced vibrations.

APPLICATIONS

The study of natural frequency and resonance and its effect on natural vegetation and trees, agriculture, and man-made constructions is an important and practical application of the fluid dynamics discipline. Natural frequency is the frequency at which an object vibrates once it has been set in motion. Resonance is the tendency of an object to oscillate at its maximum amplitude at certain frequencies. Resonance also has applications in acoustics.

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