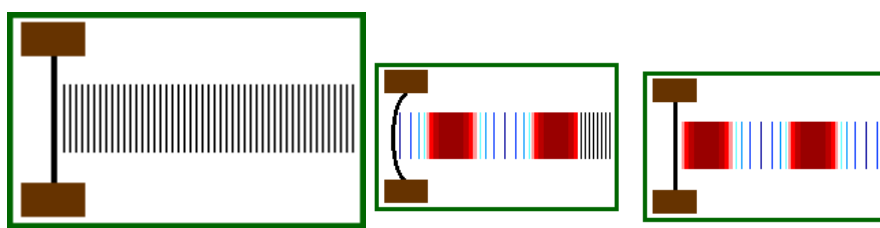


EXAMEN : baccalauréat Général – Série S –SVT ou S-SI	SESSION 2014
EPREUVE : Evaluation spécifique de Langue en section européenne	
<b>PHYSIQUE – CHIMIE en langue ANGLAISE</b>	
THEME : ONDES ET MATIERE	Sujet n°04

### Longitudinal Waves and Guitar Strings

A sound wave is produced by a vibrating object. As a guitar string vibrates, it sets surrounding air molecules into vibrational motion. The frequency at which these air molecules vibrate is equal to the frequency of vibration of the guitar string. The back and forth vibrations of the surrounding air molecules creates a pressure wave which travels outward from its source. This pressure wave consists of compressions and rarefactions. The compressions are regions of high pressure, where the air molecules are compressed into a small region of space. The rarefactions are regions of low pressure, where the air molecules are spread apart. This alternating pattern of compressions and rarefactions is known as a sound wave.



In solids, sound can exist as either a longitudinal or a transverse wave. But in mediums which are fluid (e.g., gases and liquids), sound waves can only be longitudinal. A careful inspection of the particles of the medium (represented by lines) reveal that the particles of the medium are displaced rightward and then move back leftward to their original position. There is no net displacement of the air molecules. The molecules of air are only temporarily disturbed from their rest position; they always return to their original position.

A guitar string vibrating by itself does not produce a very loud sound. The string itself disturbs very little air since its small surface area makes very little contact with surrounding air molecules. However, if the guitar string is attached to a larger object, such as a wooden sound box, then more air is disturbed. The guitar string forces the sound box to begin vibrating at the same frequency as the string. The sound box in turn forces surrounding air molecules into vibrational motion. Because of the large surface area of the sound box, more air molecules are set into vibrational motion. This produces a more audible sound.

<http://www.physicsclassroom.com/mmedia/waves/gsl.cfm>

#### QUESTIONS :

1. Present and comment on the document
2. Don't forget to focus on at least one physics or/and chemistry topic such as the characteristics of wave.
3. Do you know any properties of wave that are useful in our daily life?