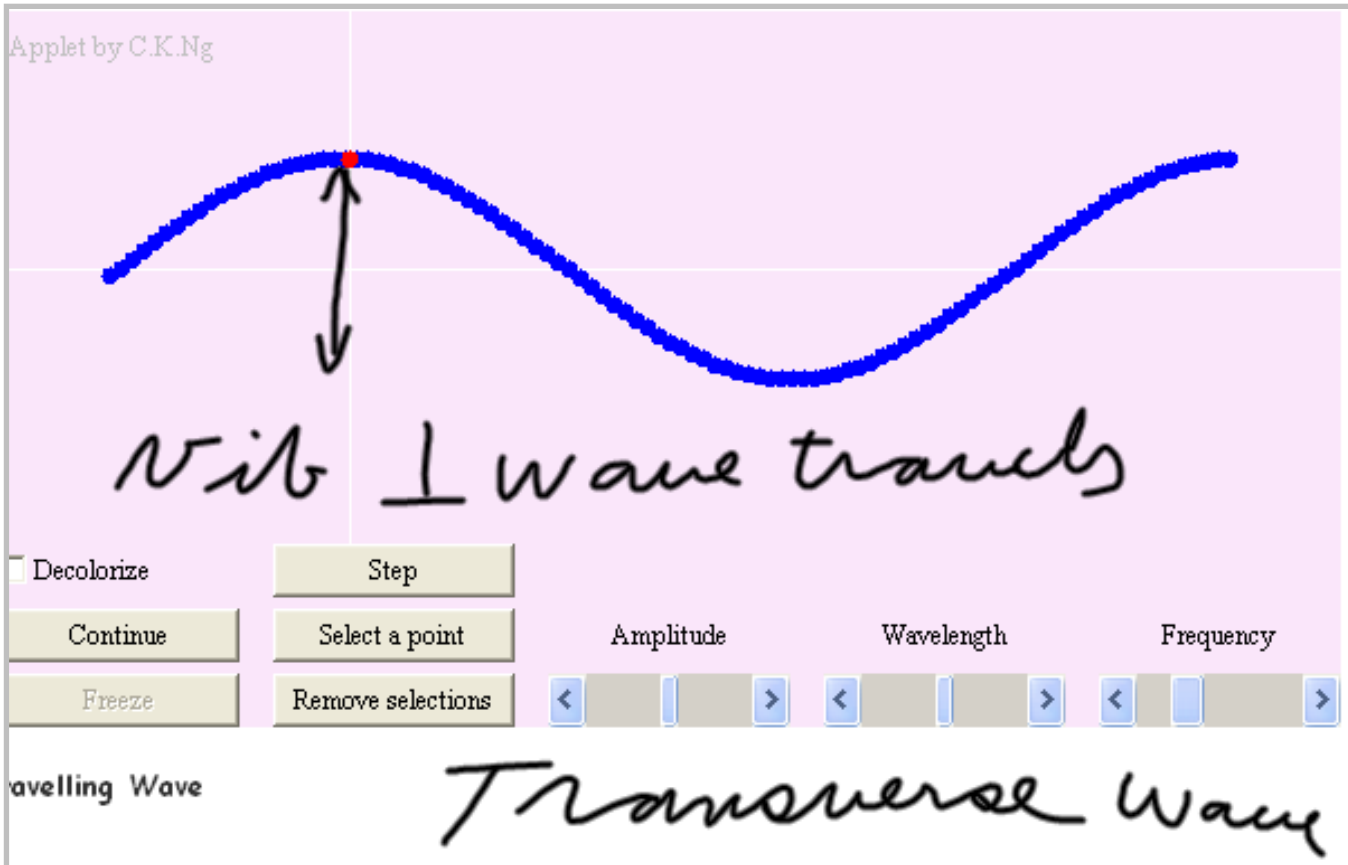
standing transverse with reflection (fixed)

http://www.ngsir.netfirms.com/englishhtm/TwaveA.htm

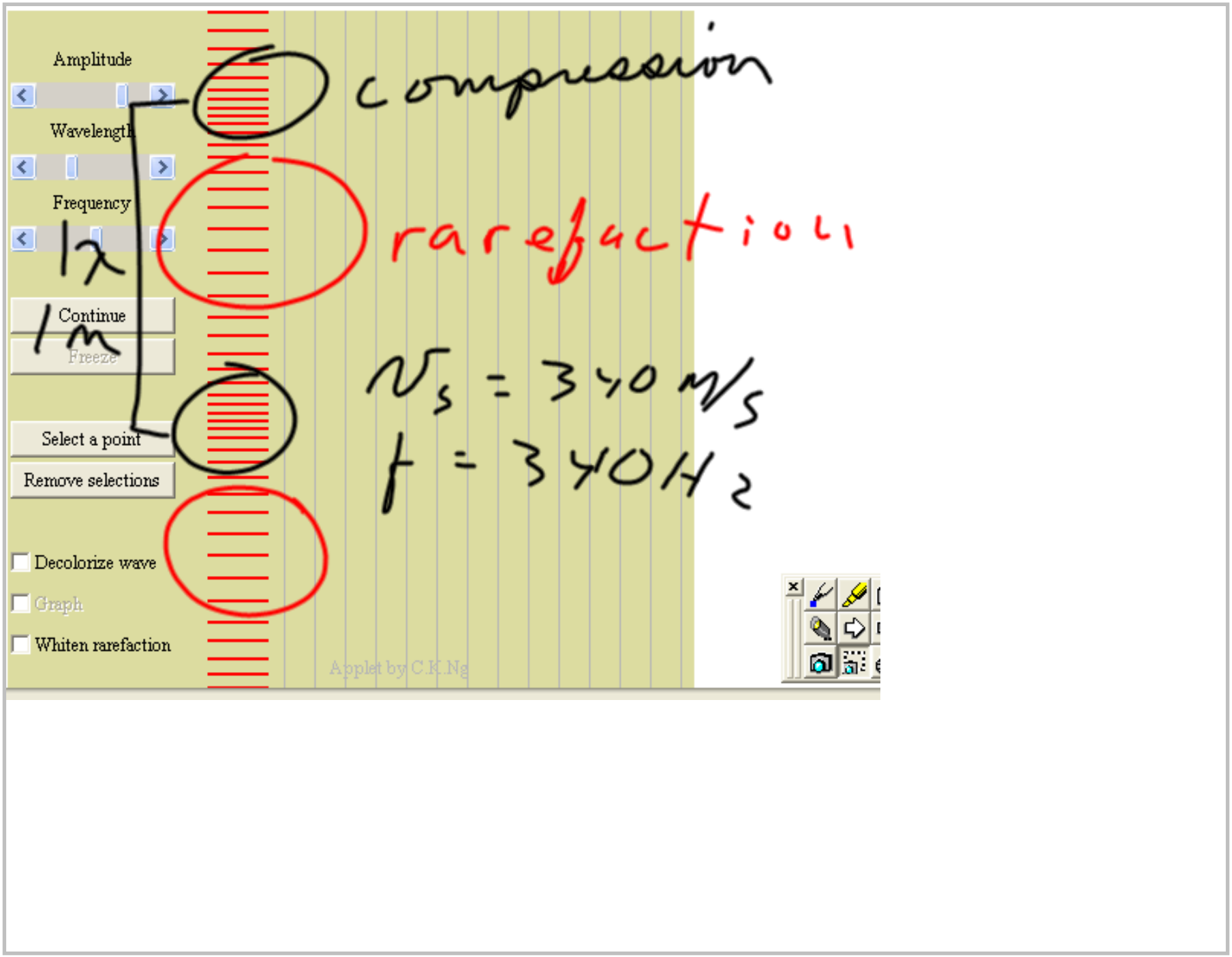
http://www.walter-fendt.de/ph14e/stwaverefl.htm



Title: Apr 25 - 8:22 AM (2 of 10)

http://www.ngsir.netfirms.com/englishhtm/Lwave.htm

long. wave http://www.kettering.edu/~drussell/Demos/waves/wavemotion.html


Amplitude
Wavelength
Frequency
Continue
Freeze
Select a point
Remove selections
Decolorize wave
Graph
Whiten rarefaction
Applet by C.K.Ng
compression
rarefaction
1λ
1m
$v_s = 340\ m/s$
$f = 340\ Hz$

fixed and free reflection/transmission

http://physics.usask.ca/~hirose/ep225/animation/reflection/anim-reflection.htm

http://www.kettering.edu/~drussell/Demos/reflect/reflect.html

boundaries:
fixed (rigid) - from a slower to a faster med.
open (free) - from a faster to a slower medium

Fixed:
sound air - glass
air - wall

open:
sound glass-air

standing waves (mult. loops)

http://www.ngsir.netfirms.com/englishhtm/TwaveStatA.htm

http://physics.usask.ca/~hirose/ep225/animation/standing1/anim-stwave1.htm

superposition

http://www.kettering.edu/~drussell/Demos/superposition/superposition.html

doppler effect

http://www.kettering.edu/~drussell/Demos/doppler/doppler.html

Sound

$P = .5\,W$

$r = 6.0\,m$

$f = 340\,Hz$

$I = ?$

$\chi = ?$

$$I = \frac{P}{A}$$

$$I = \frac{P}{4\pi r^2}$$ ← surface area of sphere

$$I = \frac{.5\,W}{4\pi (6\,m)^2}$$

$$I = .0011\,W/m^2$$

$$I = 2\pi^2 \rho v f^2 \chi_0^2$$

$$\chi_0 = \sqrt{\frac{I}{2\pi^2 \rho v f^2}}$$

$$\chi_0 = \sqrt{\frac{.0011\,W/m^2}{2\pi (1.29\,kg/m^3)\,340\,m/s\,(340\,Hz)^2}}$$

$$\chi_0 = 1.04 \times 10^{-6}\,m$$

distance air particles vibrate as wave pass through.

same wave in steel!

cyl. shaped bar

rad = 2.0 cm

$$I = \frac{P}{A} = \frac{.5W}{\pi(.02m)^2}$$

$$I = 398 W/m$$

$$X = \sqrt{\frac{I}{2\pi^2 \rho v f^2}}$$

$$X = \sqrt{\frac{398 W/m^2}{2\pi^2 (7900 kg/m^3)\, 503 m/s\, (340 Hz)^2}}$$

$$= \sqrt{\frac{E}{\rho}}$$

$$X_o = 2.0 \times 10^{-6} m$$

$$= \sqrt{\frac{200 \times 10^9 N/m^2}{7900 kg/m^3}}$$

$$= 503 m/s$$