

Year 11 ATAR Physics – Unit 2

Revision Checklist – Waves

Science as a Human Endeavour

- Application of the wave model has enabled the visualisation of imaging techniques. These can include:
 - medical applications, such as ultrasound
Nelson p. 351
 - geophysical exploration, such as seismology.
Nelson pp. 347, 350
WACE Study Guide pp. 141-142
- Noise pollution comes from a variety of sources and is often amplified by walls, buildings and other built structures. Acoustic engineering, based on an understanding of the behaviour of sound waves, is used to reduce noise pollution. It focuses on absorbing sound waves or planning structures so that reflection and amplification do not occur.
Nelson p. 348

Science Understanding

- waves are periodic oscillations that transfer energy from one point to another
WACE Study Guide pp. 130
Hamper p. 150
Heinemann Ch. 5.1, p. 184
Nelson p. 313
Exploring Physics Problem Set 19
- mechanical waves transfer energy through a medium; longitudinal and transverse waves are distinguished by the relationship between the directions of oscillation of particles relative to the direction of the wave velocity
WACE Study Guide pp. 130-131
Hamper p. 167,170-171
Heinemann Ch. 5.1, pp. 184-187
Nelson p. 313-322
Exploring Physics Problem Set 19
- waves may be represented by displacement/time and displacement/distance wave diagrams and described in terms of relationships between measurable quantities, including period, amplitude, wavelength, frequency and velocity
This includes applying the relationships
$$v = f \lambda , \quad T = \frac{1}{f}$$

WACE Study Guide pp. 131-134
Hamper pp. 152, 154-155, 167-168, 170-171
Heinemann Ch. 5.1, pp. 188-191; 5.1 Questions p. 191
Nelson p. 313-322
Exploring Physics Problem Set 19
- the mechanical wave model can be used to explain phenomena related to reflection and refraction, including echoes and seismic phenomena
WACE Study Guide pp. 137-142
Hamper pp. 162-166, 172-175, 178, 186-189
Heinemann Ch. 5.2, pp. 192-200; 5.2 Questions pp. 200-201
Nelson p. 323-329; 368-379
Exploring Physics Problem Set 20

- the superposition of waves in a medium may lead to the formation of standing waves and interference phenomena, including standing waves in pipes and on stretched strings

This includes applying the relationships for

strings attached at both ends and pipes open at both ends

$$\lambda = \frac{2\ell}{n}$$

pipes closed at one end

$$\lambda = \frac{4\ell}{(2n-1)}$$

WACE Study Guide pp. 143-149

Hamper pp. 168-170, 176-177, 179-181

Heinemann Ch. 5.3, pp. 201-203; 206-213; 5.3 Questions pp. 213-214

Nelson p. 330-332; 334-341; 392-395

Physics Problems (handout): Set 28 Beats & Resonating Air Columns including additional formula:

$$\lambda = 2(L_1 - L) - \text{not on data sheet}$$

Exploring Physics Problem Set 20

- a mechanical system resonates when it is driven at one of its natural frequencies of oscillation; energy is transferred efficiently into systems under these conditions

WACE Study Guide pp. 146

Hamper pp. 465-470

Heinemann Ch. 5.3, pp. 204-205;

Nelson p. 322-333

Exploring Physics Problem Set 20

- the intensity of a wave decreases in an inverse square relationship with distance from a point source

This includes applying the relationship

$$I \propto \frac{1}{r^2}$$

WACE Study Guide pp. 135-137

Hamper p. 186

Nelson p. 343

WACE Study Guide has Waves Review Questions pp. 150-156 and a Trial Test pp. 182-189