Year 10 Physics Checklist
P1 Waves

Infrared signals
• remote controls (TV, DVD etc.);
• mobile data links (to PC etc);
• burglar alarms and security lights (detect body heat);
• passive infrared cameras

Analogue signals:
Continuously variable and easy to use to view changing signals.

Digital signals:
Based on two values on (1) and off (0). Allows many signals to be transmitted together - multiplexing. Errors are easily recognised and rejected - more accurate signal transmission.

Optic fibres:
Transmit light and infrared signals by **TOTAL INTERNAL REFLECTION (TIR)**. TIR occurs if light travels from glass to air and the incident angle is greater than the **CRITICAL ANGLE** (42 degrees for glass). Ray diagrams for refraction and TIR. Transmission of data at speed of light. Digital information sent by pulses of light. Frequency multiplexing using different colours or frequencies of light/infrared signals.

Wireless signals:
Radio and microwave signals used to transit data eg computer networks (laptops) mobile phones and radio. Radio signals reflected from the ionosphere to extend their range. Satellite TV signals absorbed and re-transmitted by geostationary satellites above the Earth's surface. Refraction of radio signals can occur between layers of the atmosphere. Diffraction of signals occurs at dishes leading to signal loss. Radio and TV switching to digital for better reception - no interference from similar frequency signals.

Light:
• **Wavelength** - distance between two adjacent crests or troughs.
• **Time Period** - time for one complete cycle
• **Wave Speed** - speed of wave energy
• **Amplitude** - Maximum displacement of medium
• **Frequency** - number of compete waves a second.

Wave equation:

Wave speed = wavelength x frequency

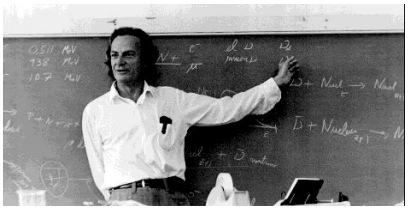
Light communication:
Morse code used over long distances (light and radio). Radio has longer range - less absorbed than light.

Laser light:
Intense beam of light. All the light has the same frequency and is completely in phase. Lasers are used in CDs to pickup reflections from tiny pits on the CD which contain digital information.

Seismic Waves:
• **P-waves** faster, longitudinal, travel through solid and liquid rock.
• **S-waves** slower, transverse, travel ONLY through solid rock hence NOT through liquid outer core.
• Describe seismograms produced at different locations on the Earth's surface.

Ultra-violet radiation:
Causes, suntan, sunburn and skin cancer. Sun Protection Factor used to calculate the time a person can stay out in the Sun without burning. Darker skin colour absorbs more UV so can withstand more exposure before damage occurs. Ozone in the upper atmosphere absorbs a lot of the Sun's UV rays. CFCs from aerosols, fridges have been blamed for thinning the ozone layer.

Global warming: Greenhouse gases lead to increase in Earth's temperature. Know possible man-made and natural causes of fluctuations in greenhouse gases. Dust from volcanoes and factories reflect Sun's infra-red light.

Do not keep saying to yourself, if you can possibly avoid it, 'But how can it be like that?' because you will get 'down the drain' into a blind alley from which nobody has yet escaped. Nobody knows how it can be like that.

Richard Feynman