National 4 Physics Unit 3 Waves & Radiation

Name_____ **Class**_____

✓ I am confident that I understand this and I can apply this to problems ? I have some understanding but I need to revise this some more ✗ I don't know this or I need help with this In normal font – NAT 4 **In Bold – NAT 5**

3.1 Wave Characteristics	Covered (✓)	How well can you do this?
1.Do I know that waves transfers energy from one place to another?		✗ ? ✓
2. Do I know that a Longitudinal wave is a compression wave?		✗ ? ✓
3. Do I know that a longitudinal wave is a wave in which the vibration is along the same direction as the wave is travelling?		✗ ? ✓
4. Do I know that a sound wave is a longitudinal wave?		✗ ? ✓
5.Do I know that a transverse wave is a wave in which the vibration is at right angles to the direction of travel?		✗ ? ✓
6. Do I know that the wavelength of a wave is the distance between one crest and the next crest or one trough and the next trough and is measured in metres (m)?		✗ ? ✓
7. Can I find the wavelength of a wave from a diagram?		✗ ? ✓

8. Do I know that the amplitude of a wave is the distance from the middle of the wave to the crest or the middle of the wave to the trough?		✗ ? ✓
9. Do I know that the frequency of a wave is the number of waves per second and is measured in Hertz (Hz)?		✗ ? ✓
10. Can I find the frequency of a wave from a diagram?		✗ ? ✓
11. Do I know that wave speed is measured in metres per second (m/s)?		✗ ? ✓
12. Can I carry out calculations on distance, speed and time of waves using the formula d = v x t?		✗ ? ✓
13. Can I carry out calculations on wave speed, frequency and wavelength using the formula v =f x λ?		✗ ? ✓
14. Do I know that diffraction happens when waves change direction when they move around objects or when waves spread out through small openings?		✗ ? ✓
15. Can I discuss the practical limitations of diffraction?		✗ ? ✓
16. Do I know that longer wavelength waves diffract more easily than shorter wavelength waves?		✗ ? ✓

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3.2 Sound	Covered (✓)	How well can you do this?
1.Do I know that sound waves can only be transmitted through solids, liquids or gases?		✗ ? ✓
2. Can I describe an experiment showing how to measure the speed of sound in air?		✗ ? ✓
3. Do I know that the speed of sound in air (340m/s) is much slower than the speed of light in air (300,000,000m/s)?		✗ ? ✓
4. Can I identify sound wave patterns from an oscilloscope screen in terms of amplitude and frequency?		✗ ? ✓
5. Can I describe the effect on the signal pattern displayed on an oscilloscope screen or computer simulation due to a change in a)Loudness of sound b)Frequency of sound?		✗ ? ✓
6. Can I measure everyday sound levels in my school using a sound level meter?		✗ ? ✓
7. Can I give at least four examples of everyday sound levels using the decibel scale?		✗ ? ✓
8.Do I know that noise pollution is any unwanted sound?		✗ ? ✓
9.Can I give examples of noise pollution such as loud music, alarm bells, pneumatic drills, jet aircraft engines?		✗ ? ✓

10. Have I discussed the risks to human hearing due to noise pollution?		✗ ? ✓
11. Do I know that high frequency deafness is a common hearing defect?		✗ ? ✓
12. Have I discussed methods of protecting human hearing using ear protectors?		✗ ? ✓
13. Can I give examples of how sonar is used in depth location for example, to find shoals of fish or to map the sea floor?		✗ ? ✓
14. Do I know the range of human hearing is 20 Hz to 20,000 Hz?		✗ ? ✓
15. Do I know that high frequency sounds above 20,000 Hz are called ultrasounds?		✗ ? ✓
16.Can I give examples of applications of ultrasound in medicine?		✗ ? ✓
17. Have I explored sound reproduction technologies?		✗ ? ✓
18. Can I discuss how noise cancellation works in relation to noise-cancelling headphones and noise cancellation technology in Humvees and helicopters?		✗ ? ✓
19. Have I investigated the sound produced from tuning forks and the production of notes from musical instruments?		✗ ? ✓
20.Have I explored technology used to record and enhance sound?		✗ ? ✓

3.3 Electromagnetic Spectrum	Covered (✓)	How well can you do this?
1.Do I know that the EM spectrum is a large group of waves with a wide range of wavelengths and frequencies BUT they ALL travel at the same speed (300,000,000 m/s)?		✗ ? ✓
2. Do I know that the waves in the electromagnetic spectrum are called gamma, x-rays, ultraviolet, visible light, infrared, microwaves, TV and radio waves?		✗ ? ✓
3. Can I name the waves in the EM Spectrum which have the highest frequencies and therefore shortest wavelengths?		✗ ? ✓
4.Can I name the waves in the EM Spectrum which have the lowest frequencies and therefore longest wavelengths?		✗ ? ✓
5. Do I know that the greater the frequency of wave the more energy it carries?		✗ ? ✓
6. Have I discussed applications and sources of electromagnetic radiations in industry and leisure?		✗ ? ✓
7. Have I investigated the detection of EM radiations? This could include microwave leakage from electrical devices (eg ovens, TV's, mobile phones, tablet computer and Wi-Fi hubs), Display of pulses from a remote control handset using phototransistors, IR sensitive sheets, Dye/Paint sensitive to UV radiation, Spectral analyse plot on digital camera display or photo editing software.		✗ ? ✓

8. Have I investigated typical jobs in industry and leisure which would make use of electromagnetic radiations?		✗ ? ✓
9. Have I investigated possible hazards when using EM radiation?		✗ ? ✓
11. Have I discussed the safety precautions that need to be taken when using radiations?		✗ ? ✓
12. Can I describe what is meant by refraction of light in terms of wave speed?		✗ ? ✓
13. Can I identify from a diagram the angle of incidence, angle of refraction and the normal?		✗ ? ✓
14. What is meant by the critical angle?		✗ ? ✓
15. Can I describe an experiment showing how to measure the critical angle?		✗ ? ✓
16. Can I draw ray diagrams for the eye which show the focussing of light on the retina for NORMAL, LONG and SHORT sight?		✗ ? ✓
17. Can I draw ray diagrams to show how a concave lens can correct short sight?		✗ ? ✓
18. Can I draw ray diagrams to show how a convex lens can correct long sight?		✗ ? ✓

3.4 Nuclear Radiation	Covered (✓)	How well can you do this?
1.Can I describe a simple model of the atom which includes protons, neutrons and electrons?		✗ ? ✓
2.Do I know that Alpha radiation is a particle made up of two protons and two neutrons (nucleus of a helium atom)?		✗ ? ✓
3.Do I know that Beta radiation is a very small, fast moving particle called an electron?		✗ ? ✓
4.Do I know that Gamma radiation is a high energy EM wave?		✗ ? ✓
5. Can I explain what is meant by ionization?		✗ ? ✓
6. Do I know that nuclear radiation causes ionization?		✗ ? ✓
5. Do I know what materials will absorb Alpha, Beta or Gamma radiation?		✗ ? ✓
6.Can I give at least two examples of sources of background radiation?		✗ ? ✓
7.Have I researched how to extract naturally occurring radioactive materials?		✗ ? ✓
8.Have I discussed artificial sources of radiation?		✗ ? ✓

9.Do I know that radiation can kill or damage living cells?		✗ ? ✓
10.Can I research society's reliance on radioactivity for a range of medical and industrial applications of nuclear radiation including energy sources?		✗ ? ✓
11.Can I compare the risks involved due to nuclear radiation?		✗ ? ✓
12. Can I use and understand the calculations based on the absorbed dose (D= E/m) and the equivalent dose (H= Dw)?		✗ ? ✓
13. Can I compare the equivalent dose due to a variety of natural and artificial sources?		✗ ? ✓
14. Can I calculate the Activity of a source measured in Bequerels (A= N/t)?		✗ ? ✓
15. Can I investigate 'Half-Life' and its importance in medical and industrial applications?		✗ ? ✓
16.Can I use graphical and numerical data to determine half-life?		✗ ? ✓
17.Can I investigate environmental hazards of nuclear radiation?		✗ ? ✓
18.Can I discuss how you would manage the risks involved with nuclear radiation?		✗ ? ✓
19.Can I research natural sources (eg Radon) and man-made sources (eg Plutonium) of nuclear radiation?		✗ ? ✓

20.Can I research the effects of nuclear radiation of living things (eg leukaemia)?		✗ ? ✓
21. Can I research the effects of nuclear radiation on non-living things (eg scintillation, sparks between high voltages)?		✗ ? ✓
22. Can I discuss the pros and cons of generating electricity using nuclear fuel?		✗ ? ✓
23. Can I use data to compare the risk due to nuclear radiation and other environmental factors?		✗ ? ✓
24. Discuss how to manage the risks of nuclear radiation and environmental hazards.		✗ ? ✓
25.Can I describe qualitatively fission and fusion emphasising the importance of these processes in the generation of energy?		✗ ? ✓