	Physics for Scientists and Engineers	Principles of Physics	Conceptual Physics
3.6 Mechanics			
3.6.1 Vectors			
Resolution of vectors into two components at right angles to each other.	3.4	3.4	3.4
Addition rule for two vectors, mathematical calculations limited to two perpendicular vectors.	3.5 - 3.8	3.5 - 3.8	3.5 - 3.7
3.6.2 Kinematics			
Graphical representation of uniformly accelerated motion. Use of kinematic equations in one dimension for motion with constant velocity or constant acceleration.	Chapter 2	Chapter 2	Chapter 2
Two dimensional motion under constant force. Independent effect of perpendicular components of a force.	Chapter 4	Chapter 4	Chapter 4
Interpretation of speed and displacement graphs for motion with non-uniform acceleration.	2.30 (click spreadsheet link near bottom of page), 15.2 - 15.3, 15.10, 15.15, 15.32	2.27 (click spreadsheet link near bottom of page), 15.2, 15.9, 15.13, 15.27	14.2, 14.7, 14.13
3.6.3 Dynamics			
Use of F = ma in situations where mass is constant.	Chapters 5 & 6	Chapters 5 & 6	Chapter 5
3.7 Momentum and energy			
3.7.1 Momentum concepts			
Definition of momentum, p = mv.	8.1	8.1	7.1
Application of principle of conservation of momentum to problems in one dimension.	8.7 - 8.16	8.6 - 8.15	7.5 - 7.12
Force as rate of change of momentum in situations where mass is constant.	8.2 - 8.6	8.2 - 8.5	7.2 - 7.4
3.7.2 Energy concepts			
Calculation of work done, for constant forces, when force is not along the line of motion. Quantitative application of conservation of energy including use of gravitational potential energy $mg\Delta h$, kinetic energy $\frac{1}{2} mv^2$ and energy required for change of temperature = $mc\Delta\theta$.	7.1, 7.6, 7.8, 7.16, 7.22 - 7.25, 19.17 - 19.19	7.1, 7.4, 7.6, 7.13, 7.19 - 7.22, 19.14 - 19.16	6.1, 6.2, 6.4, 6.10, 6.16 - 6.19, 18.12 - 18.13
3.7.3 Molecular kinetic theory			
Concept of internal energy as the random distribution of potential and kinetic energy amongst molecules.	19.9	19.7	18.6
Ideal gas equation, pV=nRT.	20.5	20.5	19.5
Concept of absolute zero.	19.6	19.4	18.4

	Physics for Scientists and Engineers	Principles of Physics	Conceptual Physics
T ∝ average kinetic energy of molecules for an ideal gas.	20.10	20.10	19.9
3.8 Electricity			
3.8.1 Current			
Electric current as rate of flow of charge, $I = \Delta q/\Delta t$.	27.1	27.1	25.1
3.8.2 Emf and potential difference			
The definition of emf and concept of internal resistance.	29.2, 29.4	29.2, 29.4	27.2
Potential difference in terms of energy transfer, V=W/q, V=P/I.	25.15 - 25.17, 27.13, 27.15, 27.16, 27.18	25.10 - 25.12, 27.8, 27.10, 27.11, 27.13	24.7 - 24.8, 25.7, 25.9 - 25.11
3.8.3 Resistance			
Resistance defined by R=V/I. Resistivity defined by ρ=RA/L.	27.6, 27.8	27.3, 27.5	25.3, 25.5
Ohm's Law as a special case where I ∝ V.	27.6	27.3	25.3
Power dissipated as $P=I^2R$.	27.13, 27.18	27.8, 27.13	25.7, 25.11
3.8.4 DC circuits			
Conservation of charge and energy in simple DC circuits.	29.3, 29.10, 29.20	29.3, 29.10, 29.20	27.3, 27.9
The relationships between currents, voltages and resistances in series and parallel circuits.	Chapter 29	Chapter 29	Chapter 27
Potential divider, excluding the potentiometer as a measuring instrument.	29.9	29.9	27.8
3.8.5 Capacitance			
Definition of capacitance C =q/V.	28.1	28.1	26.1
Use of E = ½ q V.	28.9	28.7	26.4
Quantitative treatment of discharge curves.	29.32 - 29.33	29.32	
3.9 Atomic and nuclear physics			
3.9.1 Probing matter			
Scattering as a means of probing matter, including a qualitative discussion of the choice of bombarding radiation or particle, the physical principles involved in the scattering process, the processing and interpretation of data.	40.22, 44.2	39.16, 43.2	38.2
3.9.2 Ionising radiation			
Connections between nature, penetration and range for ionising particles.			
The activity of unstable sources; modelling using constant decay probability leading to exponential decay and the idea of half life.	44.15 - 44.21	43.15 - 43.21	38.15 - 38.18
Changes in the sources due to the particles emitted, for example, changes to nucleon number and proton number as a result of emissions.	44.15 - 44.17	43.15 - 43.17	38.15 - 38.16
3.9.3 Energy			
$E=mc^2$ applied to nuclear processes.	44.9 - 44.14	43.9 - 43.14	38.9 - 38.14

	Physics for Scientists and Engineers	Principles of Physics	Conceptual Physics
Appreciation that $E=mc^2$ applies to all energy changes.	41.23 - 41.26	40.16 - 40.19	35.12
Simple calculations relating mass difference to energy change.	41.23, 44.9 - 44.10	40.16, 43.9 - 43.10	35.12, 38.9 - 38.10
Descriptions of the processes of fission and fusion.	44.13 - 44.14	43.13 - 43.14	38.13 - 38.14
3.10 Quantum physics			
3.10.1 Photons			
The use of the photon model in explaining observable phenomena.	42.2 - 42.4, 42.6	41.2 - 41.4, 41.6	36.2 - 36.3, 36.5
The evidence supporting the photon model of electromagnetic radiation making use of effects associated with its interactions with matter. A study of one of the following would provide a suitable depth of treatment - the photoelectric effect, the formation of line spectra, the action of gas lasers or of measurable transitions in electronic devices.	Chapter 42	Chapter 41	Chapter 36
3.10.2 Matter			
The use of the quantum model when extended to particles.	Chapter 43	Chapter 42	Chapter 37
The experimental evidence supporting the quantum model for particles. A study of particle diffraction would provide a suitable depth of treatment.	Chapter 43	Chapter 42	Chapter 37
3.11 Waves and oscillations			
3.11.1 Waves			
Qualitative treatment of polarisation and diffraction.	35.21 - 35.24, Chapter 40	34.17 - 34.20, Chapter 39	30.8, 34.5
Concepts of path difference, phase and coherence.	15.8, 18.15, 39.1 - 39.3	15.7, 18.14, 38.1 - 38.3	17.7, 34.1 - 34.2
Quantitative treatment of superposition of waves from two sources.	18.15 - 18.16, 39.3 - 39.8	18.14 - 18.15, 38.3 - 38.5	17.7
Graphical treatment of standing waves.	18.2, 18.5	18.2, 18.5	17.2
3.11.2 Oscillations			
Simple harmonic motion.	Chapter 15	Chapter 15	Chapter 14
Quantitative treatment, limited to $a = - (2 \pi f)^2 x$ and the solution $x = A \cos 2 \pi f t$. Velocity as gradient of displacement - time graph.	15.2, 15.10, 15.12, 15.13, 15.15	15.2, 15.9, 15.11, 15.13	14.2, 14.7, 14.8
Qualitative treatment of free and forced vibrations, damping and resonance.	15.32 - 15.36	15.27 - 15.28	14.13 - 14.14
3.12 Fields			
3.12.1 Force fields			
Concept of a force field as a region in which a body experiences a force, $E = F/q$, $g = F/m$.	13.10, 24.1	24.1	23.1
Application of $F = ma = mv^2/r$ to motion in a circle at constant speed.	9.7 - 9.9	9.6 - 9.8	8.5