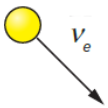
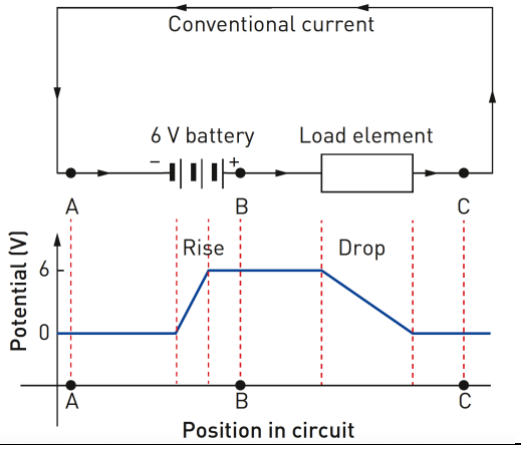
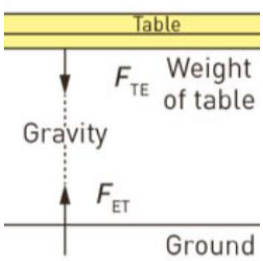
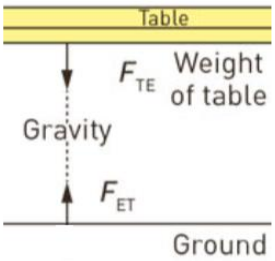
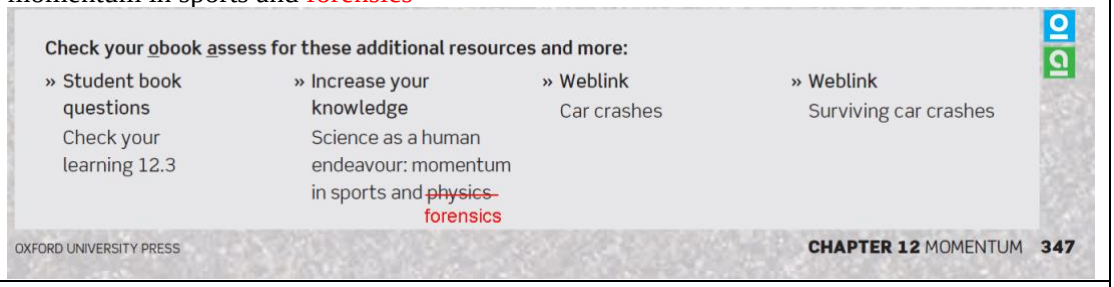
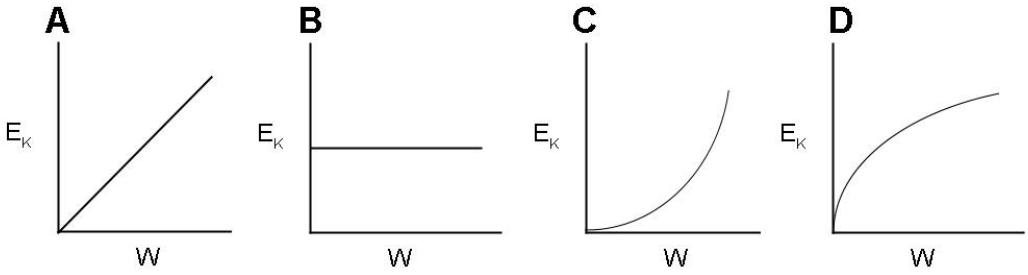
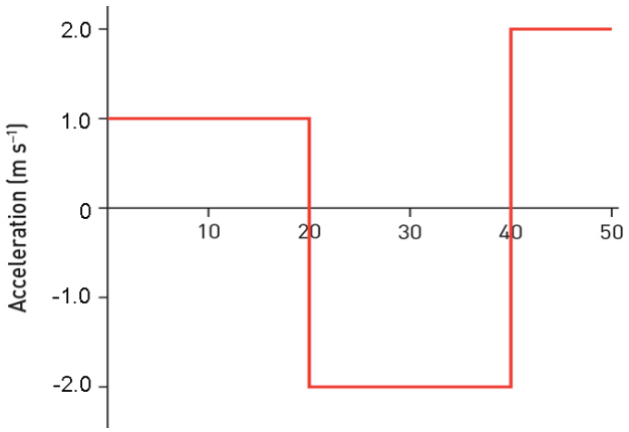
NCPQ 3ed. Corrections made to student book (SB) and obook. Richard Walding 13 September 2022.

	UNIT 1&2 STUDENT BOOK
U1&2 SB P 10 Fixed 26 May 2022	Second dot point from the bottom. Change: • Write numbers in exponential notation with just one numeral before the decimal point. For example, the Earth–Moon distance of 382 million kilometres could be expressed as 382×10^6 km or in scientific notation as 3.82×10^8 km. To: • Write numbers in exponential notation with just one numeral before the decimal point. For example, the Earth–Moon distance of 382 million metres could be expressed as 382×10^6 m or in scientific notation as 3.82×10^8 m.
U1&2 SB p 21	Worked example 0.5A Absolute uncertainty of the mean: $\delta = \pm \frac{(x_{max} - x_{min})}{2}$ $= \pm \frac{17.68 - 17.53}{2}$ $= \pm \frac{0.15}{2}$ $= \pm 0.075$ s (0.07 s) You would report this as: Time (for 10 oscillations) = 17.61 ± 0.07 s Time (for 1 oscillation) = 1.761 ± 0.007 s (Note that the uncertainty is also divided by 10.)
U1&2 SB p 21	When using standard deviation, the SD (σ) is 0.050 s for the average of 10 swings for the eight trials, or 0.005 s for the one swing. This would be reported as 1.76 ± 0.005 s (or 1.76 ± 0.01 s to two decimal places).
U1&2 SB P 87 FIXED 5 Feb 2022	Ch 1 Revision Q45. Unit for expansion coefficient is K^{-1} not $m\ K^{-1}$
U1&2 SB P 96 FIXED 5 Feb 2022	U1&2 Chapter 2.3 page 96 Worked Example 2.3C Answer is 26°C (2 sf)
U1&2 SB P 96 FIXED 5 Feb 2022	Worked Example 2.3D. Last three lines should read: $-846T_f = -58720$ $-846T_f = 69.4^oC$ $= 69^oC\,(2sf)$
U1&2 P108 FIXED 5 Feb 2022	Chapter 2 Review Question 16. "A ~~20 000 J~~ 200 J energy supply…"
U1&2 P126 FIXED 5 Feb 2022	Chapter 3.5 page 126. The second line of the equation above Figure 3 should read: 0 = Q + W, not 0 = Q + T.
U1&2 SB P168 FIXED 5 Feb 2022	Chapter 5.4 page 168 Figure 3 
U1&2 SB P170 (OUP advised 5 April 2022)	Replace the second arrow with a plus sign: Change $^{60}_{27}\text{Co} \rightarrow {}^{60}_{28}\text{Ni}^\star + {}^{0}_{-1}\text{e} \rightarrow \gamma\ (1.17\ \text{MeV})$ to $^{60}_{27}\text{Co} \rightarrow {}^{60}_{28}\text{Ni}^\star + {}^{0}_{-1}\text{e} + \gamma\ (1.17\ \text{MeV})$
U1&2 SB P170 FIXED 5 Feb 2022	6th line under heading "Decay Series". The symbol should be ^4_2He not ^2_4He
U1&2 SB P170 NEW (10 March 2022)	CYL 6.2 p 195 Q5a Product in equation should be $^{84}_{36}Kr$ not $^{32}_{36}Kr$

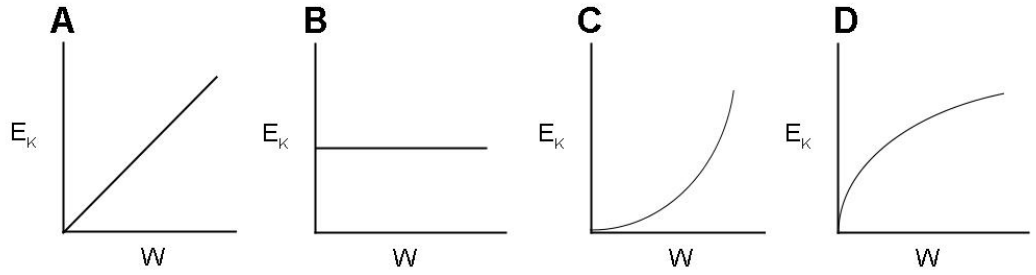
U1&2 SB p194 NEW (28 April 2022)	WORKED EXAMPLE 6.2B. Part (a). Formatting needs improvement. Should look like this: ***1.*** *Calculate the sum of the masses of all of the reactants (m_r) and the sum of the masses of all the products (m_p)* • Mass of reactants, m_r: U-235 235.043 930 u; neutron + 1.008 665 u; total m_r = 236.052 595 u • Mass of products, m_p: Sr-94 93.915356 u; Xe-139 + 138.918792 u; 3 neutrons + (3 × 1.008 665) u; total m_p = 235.860 143 u
U1&2 SB p 195 FIXED 5 Feb 2022	Chapter 6, CYL 6.2 Q5(c): ${}^{235}_{92}\mathrm{U} + {}^{1}_{0}\mathrm{n} \rightarrow {}^{152}_{60}\mathrm{Nd} + {}^{81}_{?}? + ?\,{}^{1}_{0}\mathrm{n}$
U1&2 SB P219 New 15 May 2022	Chapter 7.3 Figure 5 The battery needs to be reversed. All else is okay. Change to this: 
U1&2 SB P 226 FIXED 5 Feb 2022	Chapter 7 Revision Q21. Change to "In moving an electron from point X to point Y …"
U1&2 SB P238 Added 14 May 2022	Chapter 8 CYL 8.2 Q9 Swap headings (data underneath is correct): TABLE 3 | Current (A) ~~Voltage (V)~~ | Voltage (V) ~~Current (A)~~
U1&2 SB P265 FIXED 5 Feb 2022	Chapter 9 Revision Question 6. First column, second row should be labelled 'c'.
U1&2 SB P268 New 2 Aug 2022	Unit 1 Practice exam questions, page 268. Q7. Change "have the same circular cross section" to "have a circular cross section"
U1&2 SB P302 Fixed 5 Feb 2022	Chapter 10 Review. Note that additional summary points have been added to the first reprint and obook.
U1&2 SB P303 FIXED 5 Feb 2022	Chapter 10 Revision Q7 should read 42.2 km (not 40 km). This has been corrected in the reprint and online.
U1&2 SB P314 FIXED 5 Feb 2022	Chapter 11.3, Page 314. In margin. Mass - a characteristic of a body's resistance to *change in* motion; also called inertia
U1&2 SB P320 FIXED 5 Feb 2022	Chapter 11 Figure 3. Replace figure on left with the one on the right. Note that F_{ET} will now be the same length as F_{TE}.

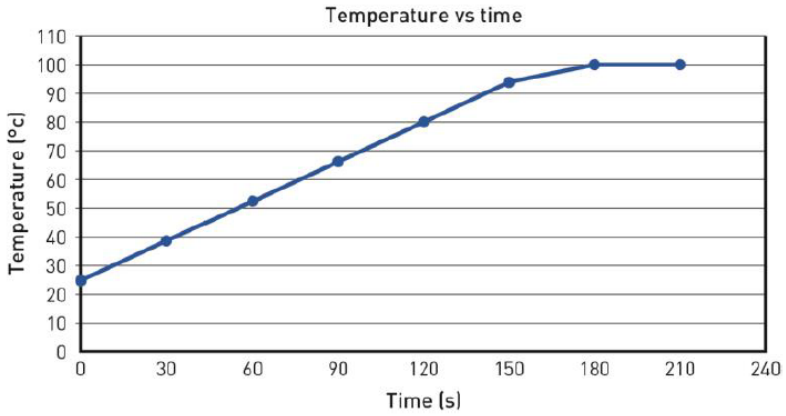
	 
U1&2 SB P347 FIXED 5 Feb 2022	"Check your obook" box at bottom. Change second entry from "Science as a human endeavour: momentum in sports and physics" to "Science as a human endeavour: momentum in sports and forensics" 
U1&2 SB P356 Noted for next edition	Chapter 13.2. To be added in the next edition. Under the equation $W = \boldsymbol{F}\,\boldsymbol{s}$ (in the middle) it is probably worth stating that The unit for work will be newton metre (N m) and this is equivalent to a joule (J).
U1&2 SB P368 FIXED 5 Feb 2022	Chapter 13.4, Worked example Second last line. There should be a space before "The first solution…
U1&2 SB P368 FIXED 5 Feb 2022	Chapter 13.4, Worked example The last line should read: "..the equation $\mathbf{v}_A = 1 - \mathbf{v}_B$ gives a value for $\mathbf{v}_A$ of -2 m s^{-1} (2 m s^{-1} to the left)".
U1&2 SB p 373 FIXED 5 Feb 2022	Chapter 13. Revision Questions Q2. Graph is missing. It looks like this:  Suggest you delete photo of lift (Figure 1) and replace it with the figure shown above. It should go after Q2 on page 373.
U1&2 SB P 387 FIXED 5 Feb 2022	Chapter 14 – CYL 14.2 Q9. Should start with "Figure 1 (page 382)…" not Figure 12.
U1&2 SB P 406 FIXED 5 Feb 2022	Chapter 14 Review. In Section 14.2 (flagged) the 3rd bullet point should say "The region of ~~maximum~~ minimum particle density is called the rarefaction."
U1&2 SB P457 FIXED 5 Feb 2022	Chapter 16.7. Middle of Figure 5. Spelling should be "principal" not "principle"
U1&2 SB P472 FIXED 5 Feb 2022	Unit 2 Practice Exam Q2. The question should ask "During which interval does the dog have the fastest velocity?
	UNIT 1&2 OBOOK
U1&2 obook NEW 10 March 2022	Flashcard glossary Chapter 1 Heat and temperature. Definition of 'energy' card should read 'the capacity to do mechanical work (symbol: E; SI unit: joule; unit symbol: J)'
U1&2 obook	Chapter 1 CYL 1.3. Q1a. Change answer from "Thermal energy" to "Microscopic energy"
U1&2 obook	Chapter 2 Revision Q2. Change answer from (B) to (A)
U1&2 obook NEW 10 Sep2022	Chapter 2 Revision Q12. The last line should read 0.0111 kg (11.1 g)

<table>
<tr><td>U1&2 obook
NEW 10 Sep 2022</td><td>Chapter 2 Revision Q 36.
Corrected answer is:
$-m_{steam}\,c_{steam}\,\Delta T_{steam} + m_{steam}\,L_v - m_w\,c_w\,\Delta T_s = m_i\,L_f$
$-m_{steam}\,c_{steam}\,(T_f - T_i)_s + m_{steam}L_v - m_w\,c_w\,(T_f - T_i)_w = m_{ice}\,L_f$
$m\,(-c_{steam}\,(T_f - T_i)_s + L_v - c_w\,(T_f - T_i)_w) = m_{ice}\,L_f$
$m\,(-2050 \times (100 - 110) + 2.26 \times 10^6 - 4180\,(0 - 100)) = 0.020 \times 3.34 \times 10^5$
$m\,(20500 + 2.26 \times 10^6 + 418000) = 6680$
$m \times 2698500 = 6680$
$m = 6680/2698500 = 0.0025$ kg
$m = 0.0025$ kg $\times 1000 = 2.5$ g
$m_{total} = 55.0 + 2.5 = 57.5$ g</td></tr>
<tr><td>U1&2 obook</td><td>Chapter 4 Revision Q5. Change answer from (C) to (C) and (D).</td></tr>
<tr><td>U1&2 obook
(added 24 Mar 2022)</td><td>Chapter 5, CYL5.1, Q3
Change Table from:
<table>
<tr><th></th><th>gamma</th><th>alpha</th><th>proton</th><th>neutron</th><th>positron</th></tr>
<tr><td>Date</td><td>1895</td><td>1899</td><td>1920</td><td>1932</td><td>Aug 1932</td></tr>
<tr><td>Discoverer</td><td>Villard</td><td>Rutherford</td><td>Rutherford</td><td>Chadwick</td><td>Anderson</td></tr>
</table>
to
<table>
<tr><th></th><th>gamma</th><th>electron</th><th>alpha</th><th>proton</th><th>neutron</th><th>positron</th></tr>
<tr><td>Date</td><td>1895</td><td>1897</td><td>1899</td><td>1920</td><td>1932</td><td>Aug 1932</td></tr>
<tr><td>Discoverer</td><td>Villard</td><td>Thomson</td><td>Rutherford</td><td>Rutherford</td><td>Chadwick</td><td>Anderson</td></tr>
</table></td></tr>
<tr><td>U1&2 obook</td><td>Chapter 6, Q5(c): $^{235}_{92}\mathrm{U} + {}^{1}_{0}\mathrm{n} \rightarrow {}^{152}_{60}\mathrm{Nd} + {}^{81}_{?}? + ?\,{}^{1}_{0}\mathrm{n}$</td></tr>
<tr><td>U1&2 obook
Added 23 Apr 2022</td><td>Chapter 7, CYL 7.4, Q2. Answer should read:
$P = VI$
$= 12 \times 2$
$= 24$ W</td></tr>
<tr><td>U1&2 obook</td><td>Chapter 7 Answers, Revision Q21. “In moving an electron from point X to point Y …”</td></tr>
<tr><td>U1&2 obook</td><td>Ch 7 Answers. Revision Q21
$V = \frac{W}{q} = \frac{2 \times 10^{-20}}{1.6 \times 10^{-19}} = 0.125\,J$</td></tr>
<tr><td>U1&2 obook</td><td>Chapter 9 Revision Q 15.
$W = \frac{V}{Q}$
$= \frac{12}{18}$
$= 0.67V$</td></tr>
</table>

U1&2 obook	Chapter 9 Revision Question 15. Answer: $V = \frac{W}{Q}$ $W = VQ = 12 \times 18$ $= 216\,\text{J}$
	Chapter 9 Revision Q30a. Reading on voltmeter should be $V = IR$ $= 6 \times 1.2$ $= 7.2\ \text{V}$
U1&2 obook	Unit 1 Practice exam (from page 269-269 of SB). For Q17(a) the answer should be: $R_{eff} = 4.0 + 2.18 = 6.18\,\Omega$
U1&2 obook	Chapter 10 CYL 10.5 Q2. Corrections are shown in red. A i **Calculate** the bungee jumper's displacement and distance travelled after 40 s. At 40 s, Displacement (area) $= \frac{30 \times 20}{2} + \frac{-20 \times 20}{2}$ $= 300 + -200$ $= +100$ m Distance $= 300 + 200$ $= 500$ m ii **Calculate** the bungee jumper's acceleration at 10 s, 30 s and 45 s. Acceleration at 10 s = gradient $= \frac{20}{20}$ $= 1.0\ \text{m s}^{-2}$ Acceleration at 30 s $= \frac{-20 - +20}{20}$ $= \frac{-40}{20}$ $= -2.0\ \text{m s}^{-2}$ Acceleration at 45 s $= \frac{0 - -20}{10}$ $= \frac{+20}{10}$ $= +2.0\ \text{m s}^{-2}$ iii **Sketch** an acceleration–time graph. 
U1&2 obook	U1&2 Challenge Ch 10.1 answers. Last paragraph is incomplete. Please add:

	Direction: D is at an elevation of 26.6° to the horizontal. If you mark a point directly under D, it will be 26.6° to the E of N. The distance between A and D is 12.2 m. Thus, the displacement BD is 12.2 m N 26.6° E at an elevation of 26.6°.
U1&2 obook	U1&2 CYL 10.4 Q3 Answer should read: $\text{Gradient} = \frac{\Delta y}{\Delta x} = \frac{20-0}{2.5-1.0} = \frac{20}{1.5}$ $= 13.3 \text{ m s}^{-1}$
U1&2 obook	CYL 10.5 Q4b. Answer: Instantaneous speed = the speed value (y-axis) at that time = 5 m s^{-1} Note: read the question carefully. The question has not asked for instantaneous acceleration at 5 s which would be the gradient to the tangent to the line at 5 s, or 1 m s^{-2}.
U1&2 obook	Chapter 10. Revision question 8c. Answer should read: $v_{av} = \frac{s}{t}$ $= \frac{76}{(9+18)}$ $= 2.8 \text{ m s}^{-1}$ north
U1&2 obook	Chapter 10. Revision Q9a. Answer is: a = 17 m s^{-2}
U1&2 obook	Chapter 11 Revision Q20 $F_{total} = F_W + F_{additional}$ $3\times10^4 = 2.5\times10^3 \times 9.8 + 2.5\times10^3 a$ $3\times10^4 = 2.45\times10^4 + 2.5\times10^3 a$ $5500 = 2.5\times10^3 a$ $a = 2.2 \text{ m s}^{-2}$ upwards $s = \frac{1}{2}at^2$ $t = \sqrt{\frac{2s}{a}}$] $= \sqrt{\frac{2\times500}{2.2}}$ $= 21.3\text{s}$
U1&2 obook	CYL12.2 Q7. Answer: $m_1u_1 = m_1v_1 + m_2v_2$ (let the forward direction be + direction) $6000\times355 = 5940v_1 + 60\times750$ $2\,130\,000 = 5940v_1 + 45\,000$ $2\,085\,000 = 5940v_1$ $v_1 = +351 \text{ m s}^{-1}$ (in the forward direction)
U1&2 obook	CYL12.2 Q10(a). Answer:

	$$m_1u_1 + m_2u_2 = (m_1 + m_2)v_1$$ $$(0.41\times10^{-3})\times u_1 + (0.170+0.350)\times 0 = ((0.41\times10^{-3}) + 0.170 + 0.350)\times 0.178$$ $$(0.41\times10^{-3})u_1 + 0 = 0.0926$$ $$u_1 = \frac{0.0926}{0.41 \times 10^{-3}}$$ $$u_1 = +226 \text{ m s}^{-1}$$
U1&2 obook	CYL 12.2 Q10(b). Fix spelling of "mas" to "mass"
U1&2 obook	CYL 13.2 Question 5c. Answer should be: Work = total area of A + B + C + D + E (see diagram below) $= \frac{1}{2}\times 20\times 2 + 20\times 2 + \frac{1}{2}\times 20\times 4 + 80\times 2 + \frac{1}{2}\times 40\times 1$ $= 20 + 40 + 40 + 160 + 20$ $= 280$ J
U1&2 obook	Chater 13 Revision Q2. The following graphs should be included: 
U1&2 obook	CYL 15.2 Q4. The first sentence should be expanded to include words in red below: *L* is length of the pipe in metres; n is the mode of vibration of the string and ranges from 1 upwards in whole numbers; λ_n is the wavelength of the progressive wave in the air in metres; *f* is the frequency of the sound wave in air in hertz (Hz, or s^{-1}); and *v* is the velocity of the sound wave in air in metres per second (m s^{-1}).
U1&2 obook	CYL 15.2 Q5. Last line should read: = 0.7565 m (75.65 cm)
U1&2 obook	Filename: NCPQ_Unit_1&2_Practice_exam.docx MC Question 6. B $^{24}_{13}\text{Al} \rightarrow {}^{24}_{12}\text{Mg} + {}^{0}_{+1}e + \nu_e$
U1&2 obook	U1&2 Practice exam. MC Question 14. Answer is (A)
U1&2 obook	U1&2 Practice exam. MC Question 22. Add: $n_{water} = 1.33$
U1&2 obook	U1&2 Practice exam. Short answer Q1b(i). Second line in solution: $-m_W c_W \Delta T_W = -m_{ice} c_{icewater} \Delta T_{icewater} + mL_f$ Should read: $-m_W c_W \Delta T_W = m_{ice} c_{icewater} \Delta T_{icewater} + mL_f$
	U1&2 Practice exam. Short answer Q2b. Second line in solution: $-m_w c_w \times T_w = m_{ice} \times C_{ice} \times T_{ice} + m \times L_f + m_{icewater} \times C_{icewater} \times T_{icewater}$ Should read: $-m_w c_w \times \Delta T_w = m_{ice} \times c_{ice} \times \Delta T_{ice} + m \times L_f + m_{icewater} \times c_{icewater} \times \Delta T_{icewater}$
U1&2 obook	U1&2 Practice exam. Question 9. Calculate how many electrons are required to produce a charge of -10 μC.
U1&2 obook	Unit 1&2 Practice exam. Short Answer Question 10: A particular tube of a pipe organ can most easily produce frequencies of 686 Hz, 1029 Hz and 1372 Hz. The speed of sound in the organ is 340 m s^{-1}.
U1&2 obook	Unit 1&2 Practice exam. Extended Answer Question 11. The final line of the answer should read: 40.5 m – 28.5 m = 12.0 m.

U1&2 obook	Unit 1 Data Test. Dataset 2 Figure 3. Please change to this: 
U1&2 obook	Unit 1 Data Test. Dataset 3 Q10. Answers. Corrections are in red. The percentage uncertainty in the resistivity is 21.0 % (from the δ% uncertainty in the gradient). The absolute uncertainty in the resistivity is: 1.20×10^{-6}- Ω m ± 21.0 %, or $1.20 \times 10^{-6} \pm 0.3 \times 10^{-6}$ So the range is from 0.9×10^{-6} Ω m to 1.5×10^{-6} Ω m. Absolute error: $E_a = \lvert O - A \rvert$ $= \lvert 1.20 \times 10^{-6} - 1.15 \times 10^{-6} \rvert \text{Wm}^{-1}$ $= 0.05 \times 10^{-6} \text{Wm}^{-1}$ $E\% = \frac{E_a}{A} \times 100$ $= \frac{0.05 \times 10^{-6}}{1.15 \times \times 10^{-6}} \times 100$ $= 4.35\%$ The accepted value of resistivity of 1.15×10^{-6} Ω m is within the experimental range of 0.9×10^{-6} Ω m to 1.5×10^{-6} Ω m. The experiment has confirmed the resistivity of nichrome wire within the experimental limitations of the equipment.
U1&2 obook	Cumulative Test, Unit 2, Short answer Q5. Delete lined spaces before first part.,
U1&2 obook	Cumulative Test, Unit 2, Short answer Q6. The question is missing. It should read: "Consider a freely falling ball that has a speed of 6.0 m s^{-1} at a certain height. Use conservation of mechanical energy to calculate the speed of the ball after falling additional 14.4 m."
	U1&2 ASSESS QUIZZES
U1&2 obook	Assess quiz. Chapter 2 Consolidate. Q1. Add the words in red: Determine which of the following determines the direction of transfer.."
U1&2 obook	Assess quiz. Chapter 2 Consolidate. Q4. Add degree symbol after the 20
U1&2 obook	Assess quiz. Chapter 2 Extend. Q2. "A 40 g piece of iron at a temperature of 120° C is placed in a container of 600 g of water…
U1&2 obook	Assess quiz. Chapter 2 Consolidate. Q4. Add degree symbol after the 20
U1&2 obook	Assess quiz. Chapter 4 Consolidate. Q5 $1.68 \times 10^{-11} J$ (correct answer) $1.86 \times 10^{-28} J$ (incorrect answer) $5.58 \times 10^{-20} J$ (incorrect answer) $1.01 \times 10^{16} J$ (incorrect answer)
U1&2 obook	Quizzes Chapter 9 Extend Q 3

<table>
<tr><td></td><td>[correct answer] a =c, b
[incorrect answer] b, a = c
[incorrect answer] c, a, b
[incorrect answer] a, b, c</td></tr>
<tr><td>U1&2 obook</td><td>Quizzes Chapter 10 Extend Q2
[correct answer] 1.5 s
[incorrect answer] 1.0 s
[incorrect answer] 2.5 s
[incorrect answer] 5.4 s</td></tr>
<tr><td>U1&2 obook</td><td>Assess Quizzes U1&2 Chapter 13 – support – Q2
<table><tr><td>Correct answer</td><td>The force on the ball is at right angles to the ball’s motion.</td></tr><tr><td>Incorrect answer</td><td>No net force acts on the ball.</td></tr><tr><td>Incorrect answer</td><td>No potential energy is being converted to kinetic energy.</td></tr><tr><td>Incorrect answer</td><td>No distance is covered by the ball.</td></tr></table></td></tr>
<tr><td>U1&2 obook</td><td>Assess quiz. Chapter 15 Extend. Q2.
2
Calculate the wavelength of the sound in air from a piano string that has a frequency of 440 Hz, on a $25^{\circ}C$ day. The speed of sound is related to temperature by the formula: v (sound) = 331 + 0.6T, where T = temperature in $^{\circ}C$.</td></tr>
</table>