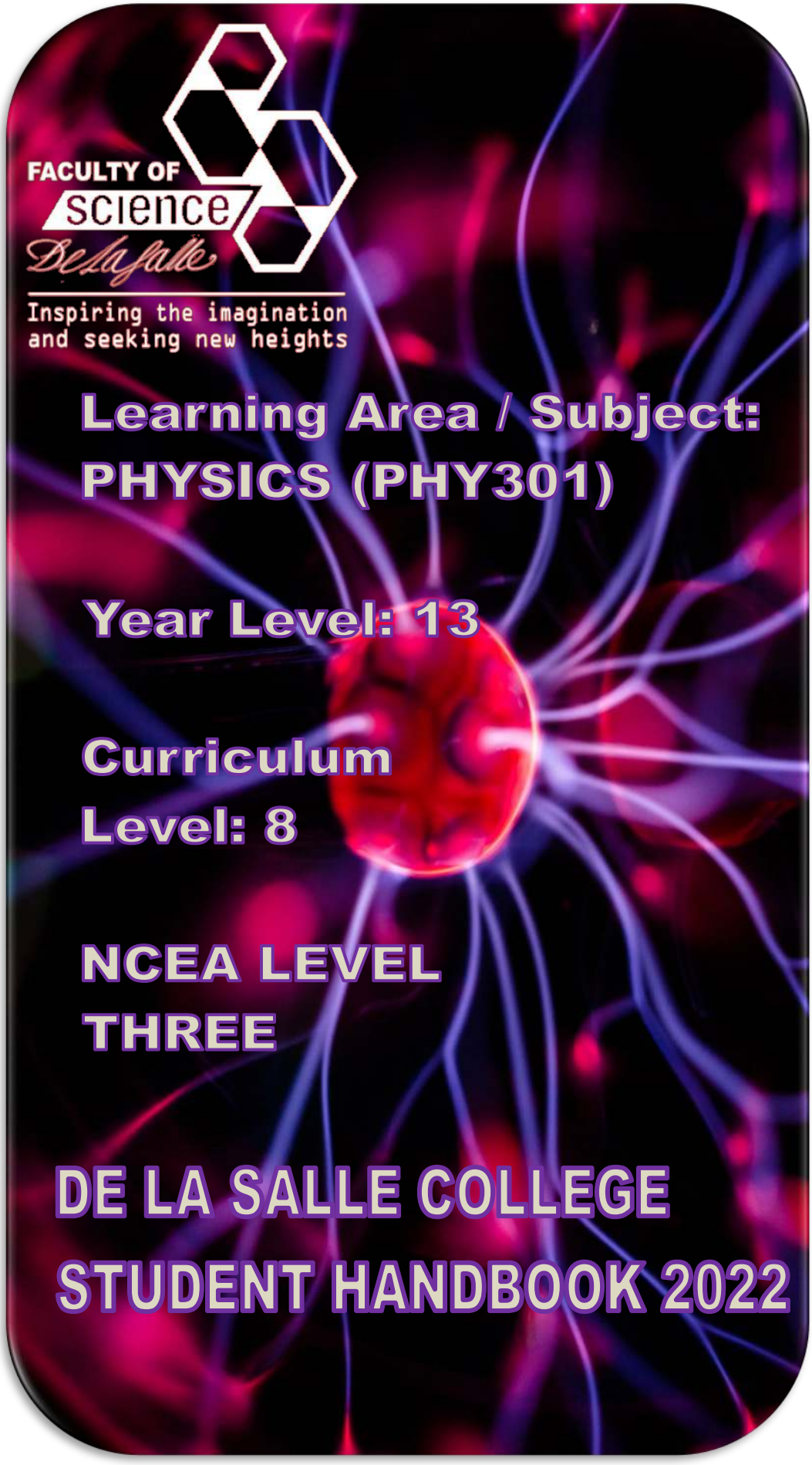
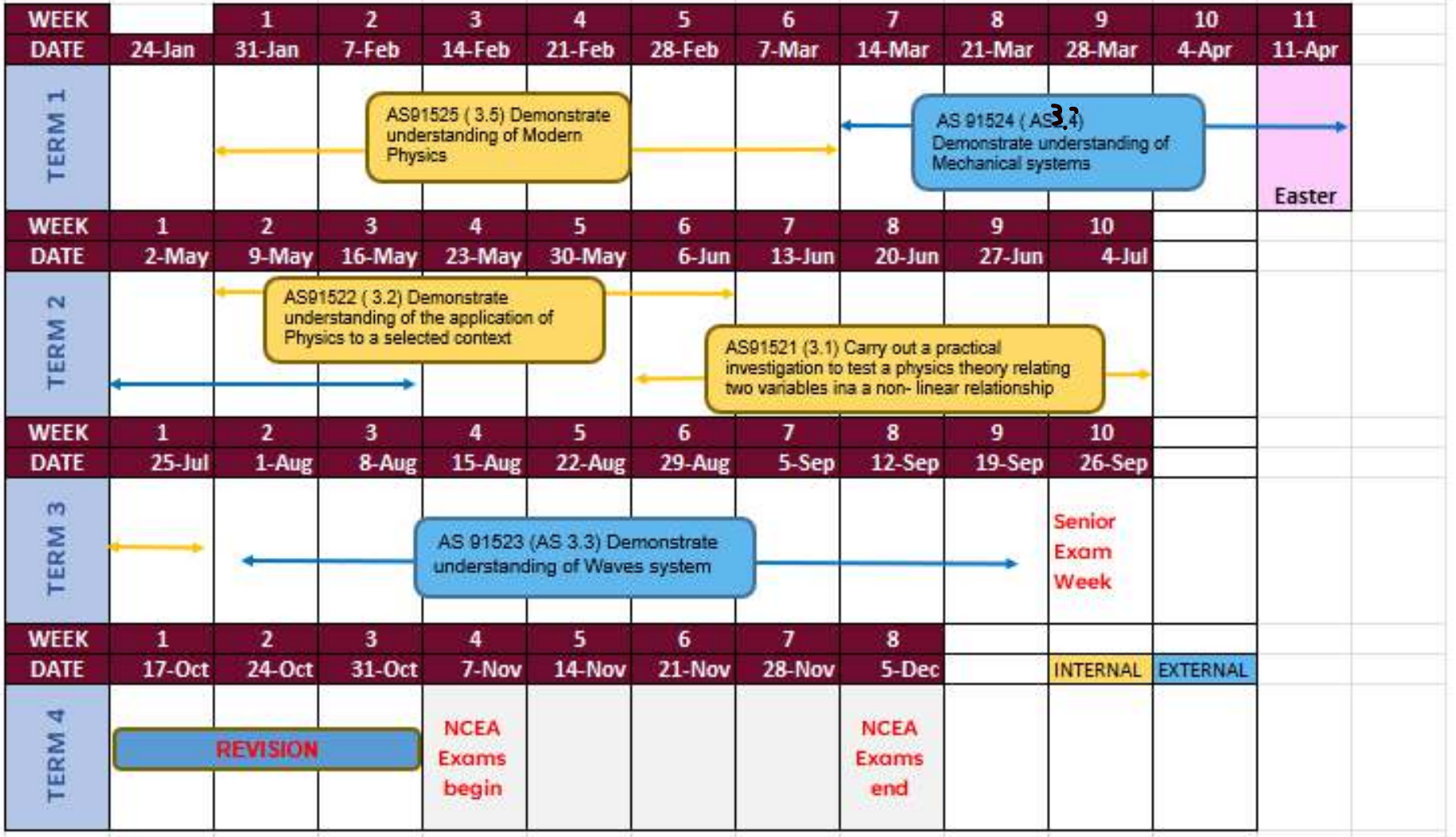


FACULTY OF SCIENCE

De La Salle College, 81 Gray Avenue, Mangere East, Manukau City

De La Salle College
2022 YEAR PLANNER

COURSE: LEVEL 3 PHYSICS
PHY301



De La Salle College

Mon, 22 Nov 2021

Science

PHY301 Assessment Statement 2022

Course is endorsable

Year : 13 | Course : Physics | Mr A Kumar | Total Credits : 20

Year 13 Physics course is an extension to Year 12 Physics. The students develop in-depth knowledge and skills in Mechanics, Waves and Modern Physics. The practical internal assessment allows students to test a Physics theory with uncertainties and report on it. Students also explore an application of Physics ideas in different context. Throughout the course the emphasis is on problem solving using mathematical skills and laws of Physics which requires a high order thinking and excellent analytical skills.

Pre Requisites
Minimum 12 Level 2 Physics Credits.

Additional Requirements
Student workbook cost $25
A scientific calculator

No	Standard Number	Version	Level	Credits	Lit / Num	Full Title	Method of Assessment	Assessment Opportunities Offered	Approximate Date	Grade	Teacher Signature
1	91521	2	3	4	L1 Lit	Physics 3.1 - Carry out a practical investigation to test a physics theory relating two variables in a non-linear relationship	Practical	1	Week 4 Term 4		
2	91522	2	3	3	L1 Lit	Physics 3.2 - Demonstrate understanding of the application of physics to a selected context	Written Report	1	Week 4 Term 2		
3	91525	2	3	3	L1 Lit	Physics 3.5 - Demonstrate understanding of Modern Physics	Exam	1	Term 1, Week 8		
4	91524	2	3	6	L1 Lit	Physics 3.4 - Demonstrate understanding of mechanical systems	Exam	External	Term 4		
5	91523	2	3	4	L1 Lit	Physics 3.3 - Demonstrate understanding of wave systems	Exam	External	Term 4		

School Assessment Procedures - You can view your rights and obligations in the school's assessment procedures in the **Student Assessment Handbook**

Record your internal grades and ask your teacher to sign it off as correct. You can then use this as evidence of your achievement.

2022 Course Outline – Y13 Physics (PHY 301)

Subject: Physics **NCEA Level:** Three

Entry Requirements: a minimum of 12 credits from NCEA Level Two Physics

Number of credits gained: 20 (+ 6 optional)

Method of assessment:

- Both internal and external assessment
- Internal assessments are given after a series of mock practice runs
- Mock externals at the end of each unit of work
- Practical Test: Summative or Formative practical tests.
- Mid Year Examinations
- Preliminary Examinations

Looking Ahead:

- Tertiary level study
- A diverse range of careers stem from Physics –
  e.g. Teacher, Meteorology, Pharmacy, Electrical, Electronic, Engineering, Lab Technician, Medicine,

Course Description

Course aims:

This course is aimed at those students who have achieved well in Year 12 and who know that they wish to pursue a career that requires Physics. Such careers include engineering, Electronics, Electrical, Meteorology and much more.

The course consists of Achievement Standards from the Level 3 Physics course.

Course learning outcomes:

- To be able to carry out a practical physics investigation with guidance, that lead to a mathematical relationship.
- To be able to describe and explain momentum conservation, centre of mass and circular motion use formulae to calculate quantities associated with above.
- To be able to describe and explain rotational motion and conservation of angular momentum and use formulae to calculate quantities associated with above.
- To be able to describe and explain simple harmonic motion and resonance and use formulae to calculate quantities associated with SHM and Resonance.
- To be able to describe and explain wave phenomena including Doppler effect, interference and standing waves and use formulae to calculate quantities associated with them.
- To be able to describe and explain effects of internal resistance, Kirchhoff's laws and capacitors and use formulae to calculate quantities associated with them.
- To be able to describe and explain effects of magnetic fields and electromagnetic induction and use formulae to calculate quantities associated with these two concepts.
- To be able to describe and explain effects associated with AC circuits, including LCR circuits and use formulae to calculate quantities associated with these two concepts.

2022 Course Assessment Statement – Y13 Physics (PHY301)

HOW WILL I BE ASSESSED IN THIS SUBJECT?

Achievement Standard	Curriculum Level	Level and Credit Value	Internal or External Assessment	Brief Description	My grades for Prelims	My final grades for Internals
91521 AS 3.1 Carry out a practical investigation to test a physics theory relating two variables in a non-linear relationship.	8	Level 3 4 credits	I	Plan an investigation, collect and process data, determine a relationship, process uncertainties		
91522 AS 3.2 Demonstrate understanding of the application of physics to a selected context	8	Level 3 3 Credits	I	Research a context which uses Physics principles and concepts.		
91523 AS 3.3 Demonstrate understanding of wave systems	8	Level 3 4 credits	E	Wave interference, diffraction grating, Doppler effect, standing waves		
91524 AS 3.4 Demonstrate understanding of mechanical systems	8	Level 3 6 credits	E	Centre of mass, 2-D momentum, circular motion two forces, Rotational motion, simple harmonic motion, reference circle and phasors		
91526 AS 3.6 Demonstrate understanding of electrical systems	8	Level 3 6 credits	E	Internal resistance, Kirchhoff's laws, capacitors, magnetic flux, induction, Faraday and Lenz's laws, Inductors, Transformer, AC circuits and resonance circuits		

Note: Depending on class ability. Extra internal assessments might be added if required and if the challenge and time is warranted.

De La Salle College Subject Year Planner 2022

Subject: 13 Physics Teacher in charge: Mr. Ajinesh Kumar Year Level: 13 Curriculum Levels: 8

Unit Title: AS91521 (AS3.1 Physics Internal) – Carry out a practical investigation to test a physics theory relating two variables in a non-linear relationship. **Achievement objectives:** • Carry out a practical physics investigation that requires the graphical identification and mathematical analysis of a relationship that is non-linear **Learning outcomes/skills:** • To be able to carry out the correct procedures to gather, process and analyse data, and interpret the results. **Assessment tasks/method:** • Data relevant to aim of investigation collected • Linear graph from data drawn • Results and findings critically discussed **Key competencies:** Thinking, Managing self, Using language, symbols, and texts. **Values:** Innovation, inquiry and curiosity, thinking, excellence **Approximate time required:** 6 weeks	**Unit Title:** AS91522 (AS3.2 Physics Internal) – Demonstrate understanding of the application of physics to a selected context. **Achievement objectives:** . • Use physics ideas to explain a technological, biological, or astronomical application of physics and discuss related issues. **Learning outcomes/skills:** • Identifies a range of physical concepts relevant to an application. • Explains how physics concepts are used in an application. • Considers broader aspects of an application, such as advantages and disadvantages, and developmental effects on/by society. **Assessment tasks/method** • Students a written report after conducting a research. **Key competencies:** Thinking, Managing self, Using language, symbols, and texts. **Values:** Innovation, inquiry and curiosity, thinking, excellence **Approximate time required:** 4 weeks	**Unit Title:** AS91523 (AS3.3Physics External) – Demonstrate understanding of wave systems **Achievement objectives:** • Investigate physical phenomena in the areas of light and waves and produce qualitative and quantitative explanations for a variety of complex situations. • Analyse and evaluate data to deduce complex trends and relationships in physical phenomena. **Learning outcomes/skills:** • Demonstrate understanding of waves in the following strands: interference (quantitative) of electromagnetic and sound waves, including multi-slit interference and diffraction gratings; standing waves in strings and pipes; harmonics and overtones; resonance; beats; Doppler Effect (stationary observer) **Assessment tasks/method:** • Mid Year Mock Examinations (Term 2). • Preliminary Mock Examinations (Term 3). • External NCEA examination at year's end. **Key competencies:** Thinking, Managing self, Using language, symbols, and texts, Participating and contributing. **Values:** Inquiry and curiosity, excellence, respect. **Approximate time required:** 8 weeks

Unit Title: AS91524 (AS 3.4 Physics External) – Demonstrate understanding of mechanical systems

Achievement objectives:

- Investigate physical phenomena in the areas of mechanics and produce qualitative and quantitative explanations for a variety of complex situations.
- Analyse and evaluate data to deduce complex trends and relationships in physical phenomena.

Learning outcomes/skills:

- Show understanding of Translational Motion: Centre of mass (1 and 2 dimensions); conservation of momentum and impulse (2D)
- Develop knowledge of principles of Circular and Rotational Motion(for example Velocity and acceleration , banked corners, vertical circles; Newton's Law of gravitation, satellite motion.
- Understand the principles of Rotational motion eg. angular speed and with constant angular acc; torque; rotational inertia; angular momentum; rot Ek; conservation of angular momentum and energy.
- Show understanding of simple harmonic motion

Assessment tasks/method:

- Mid Year Mock Examinations (Term 2).
- Preliminary Mock Examinations (Term 3).
- External NCEA examination at year's end.

Key competencies: Thinking, Managing self, Using language, symbols, and texts, Participating and contributing.

Values: Inquiry and curiosity, excellence.

Approximate time required: 8 weeks

Unit Title: AS91526 (AS3.6 Physics External) – Demonstrate understanding of electrical systems

Achievement objectives:

- Investigate physical phenomena in the areas of electricity and electromagnetism produce qualitative and quantitative explanations for a variety of complex situations.
- Analyse and evaluate data to deduce complex trends and relationships in physical phenomena.

Learning outcomes/skills:

- Show understanding of complex DC Circuits using Kirchhoffs laws.
- Investigate Capacitance (Internal resistance; parallel plate capacitor; capacitance; dielectrics; series and parallel capacitors; charge/discharge voltage/time and current/time graphs for a capacitor; time constant; energy stored in a capacitor.
- Show understanding of Electromagnetic Induction and AC Circuits. For example Magnetic flux; magnetic flux density; Faraday's Law; Lenz's Law; inductor,LCR circuits.

Assessment tasks/method:

- Mid Year Mock Examinations (Term 2).
- Preliminary Mock Examinations (Term 3).
- External NCEA examination at year's end.

Key competencies: Thinking, Managing self, Using language, symbols, and texts, Participating and contributing.

Values: Inquiry and curiosity, excellence, innovation.

Approximate time required: 9 weeks

Achievement Standard

Subject Reference Physics 3.1

Title Carry out a practical investigation to test a physics theory relating two variables in a non-linear relationship

Level 3 **Credits** 4 **Assessment** Internal

Subfield Science

Domain Physics

Status Registered **Status date** 4 December 2012

Planned review date 31 December 2020 **Date version published** 17 November 2016

This achievement standard involves carrying out a practical investigation to test a physics theory relating two variables in a non-linear relationship.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Carry out a practical investigation to test a physics theory relating two variables in a non-linear relationship.	• Carry out an in-depth practical investigation to test a physics theory relating two variables in a non-linear relationship.	• Carry out a comprehensive practical investigation to test a physics theory relating two variables in a non-linear relationship.

Explanatory Notes

1 This achievement standard is derived from *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, Level 8. The standard is aligned to Physical inquiry and physics concepts in the Physical World strand and Investigating in science in the Nature of Science strand; and is related to the material in the *Teaching and Learning Guide for Physics*, Ministry of Education, 2010 at http://seniorsecondary.tki.org.nz.

This standard is also derived from *Te Marautanga o Aotearoa*. For details of *Te Marautanga o Aotearoa* achievement objectives to which this standard relates, see the Papa Whakaako for the relevant learning area.

2 *Carry out a practical investigation* involves:
- collecting data relevant to the aim based on the manipulation of the independent variable over a reasonable range and number of values
- determining appropriate uncertainties in raw data
- using graphical analysis, including a consideration of uncertainties, from which the equation of the relationship/value of the physics quantity can be determined
- providing a conclusion that states the equation of the relationship/value of the physics quantity as determined from the graph and includes a comparison with the physics theory.

Carry out an in-depth practical investigation involves:
- describing the control of other variable(s) that could significantly affect the results
- using techniques to improve the accuracy of measurements
- determining uncertainties in one of the variables expressed in the graphical analysis
- graphical analysis which expresses the uncertainty in the relationship consistent with the uncertainty in the data
- providing a conclusion that makes a quantitative comparison between the physics theory and the relationship/quantity obtained from the experimental data which includes consideration of uncertainties.

Carry out a comprehensive practical investigation involves a discussion which addresses issues critical to the practical investigation, such as:
- the other variable(s) that could have changed and significantly affected the results, and how they could have changed the results
- the limitations to the theory's applicability both in the practical situation and/or at extreme values of the independent variable
- any unexpected outcomes of the processing of the results and a suggestion of how they could have been caused and the effect they had on the validity of the conclusion.

3 A *practical investigation* is an activity that includes gathering, processing and interpreting data.

4 The variables under investigation should have a non-linear relationship according to a physics theory provided in the task.

5 Conditions of Assessment related to this achievement standard can be found at www.tki.org.nz/e/community/ncea/conditions-assessment.php.

Replacement Information
This achievement standard replaced unit standard 6395 and AS90774.

Quality Assurance

1 Providers and Industry Training Organisations must have been granted consent to assess by NZQA before they can register credits from assessment against achievement standards.

2 Organisations with consent to assess and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Consent and Moderation Requirements (CMR) reference 0233

Achievement Standard

Subject Reference	Physics 3.2				
Title	Demonstrate understanding of the application of physics to a selected context				
Level	3	**Credits**	3	**Assessment**	Internal
Subfield	Science				
Domain	Physics				
Status	Registered	**Status date**	4 December 2012		
Planned review date	31 December 2020	**Date version published**	17 November 2016		

This achievement standard involves demonstrating understanding of the application of physics to a selected context.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Demonstrate understanding of the application of physics to a selected context.	• Demonstrate in-depth understanding of the application of physics to a selected context.	• Demonstrate comprehensive understanding of the application of physics to a selected context.

Explanatory Notes

1 This achievement standard is derived from *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, Level 8. The standard is aligned to Using physics in the Physical World strand, and Communicating in science in the Nature of Science strand; and is related to the material in the *Teaching and Learning Guide for Physics*, Ministry of Education, 2010 at http://seniorsecondary.tki.org.nz.

This standard is also derived from *Te Marautanga o Aotearoa*. For details of *Te Marautanga o Aotearoa* achievement objectives to which this standard relates, see the Papa Whakaako for the relevant learning area.

2 *Demonstrate understanding* involves relating the key physics ideas to the selected context.

Demonstrate in-depth understanding involves explaining how or why the key physics ideas relate to the selected context.

Demonstrate comprehensive understanding involves linking key physics ideas together to provide a coherent picture of the physics relevant to the selected context.

3 The *selected context* involves physics ideas at curriculum Level 8. The context may be technological, biological, or astronomical.

4 It is expected that the physics knowledge required for this standard will be different from that required for AS91527 (Physics 3.7).

5 Conditions of Assessment related to this achievement standard can be found at www.tki.org.nz/e/community/ncea/conditions-assessment.php.

Replacement Information
This achievement standard replaced unit standard 6392 and unit standard 6394.

Quality Assurance

1 Providers and Industry Training Organisations must have been granted consent to assess by NZQA before they can register credits from assessment against achievement standards.

2 Organisations with consent to assess and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Consent and Moderation Requirements (CMR) reference 0233

Achievement Standard

Subject Reference	Physics 3.3				
Title	Demonstrate understanding of wave systems				
Level	3	**Credits**	4	**Assessment**	External
Subfield	Science				
Domain	Physics				
Status	Registered	**Status date**	4 December 2012		
Planned review date	31 December 2020	**Date version published**	17 November 2016		

This achievement standard involves demonstrating understanding of wave systems.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Demonstrate understanding of wave systems.	• Demonstrate in-depth understanding of wave systems.	• Demonstrate comprehensive understanding of wave systems.

Explanatory Notes

1 This achievement standard is derived from *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, Level 8. The standard is aligned to Physical inquiry and physics concepts in the Physical World strand and Communicating in science in the Nature of Science strand, and is related to the material in the *Teaching and Learning Guide for Physics*, Ministry of Education, 2010 at http://seniorsecondary.tki.org.nz.

This standard is also derived from *Te Marautanga o Aotearoa*. For details of *Te Marautanga o Aotearoa* achievement objectives to which this standard relates, see the Papa Whakaako for the relevant learning area.

2 *Demonstrate understanding* involves showing an awareness of how simple facets of phenomena, concepts, or principles relate to a given situation.

Demonstrate in-depth understanding involves giving explanations for phenomena, concepts, or principles that relate to a given situation.

Demonstrate comprehensive understanding involves connecting concepts or principles that relate to a given situation.

3 *Wave systems* include mathematical solutions and/or written descriptions. Written descriptions may include graphs or diagrams.

4 Assessment is limited to a selection from the following:

Interference (quantitative) of electromagnetic and sound waves, including multi-slit interference and diffraction gratings; standing waves in strings and pipes; harmonics; resonance; beats; Doppler Effect (stationary observer for mechanical waves).

Relationships:

$d\sin\theta = n\lambda$ $\qquad n\lambda = \frac{dx}{L}$

$f' = f\frac{v_w}{v_w \pm v_s}$

5 Assessment Specifications for this achievement standard can be accessed through the Physics Resources page found at http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/subjects/.

Replacement Information
This achievement standard replaced unit standard 6391 and AS90520.

Quality Assurance

1 Providers and Industry Training Organisations must have been granted consent to assess by NZQA before they can register credits from assessment against achievement standards.

2 Organisations with consent to assess and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Consent and Moderation Requirements (CMR) reference 0233

Achievement Standard

Subject Reference	Physics 3.4				
Title	Demonstrate understanding of mechanical systems				
Level	3	**Credits**	6	**Assessment**	External
Subfield	Science				
Domain	Physics				
Status	Registered	**Status date**	4 December 2012		
Planned review date	31 December 2020	**Date version published**	17 November 2016		

This achievement standard involves demonstrating understanding of mechanical systems.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Demonstrate understanding of mechanical systems.	• Demonstrate in-depth understanding of mechanical systems.	• Demonstrate comprehensive understanding of mechanical systems.

Explanatory Notes

1 This achievement standard is derived from *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, Level 8. The standard is aligned to Physical inquiry and physics concepts in the Physical World strand and Communicating in science in the Nature of Science strand, and is related to the material in the *Teaching and Learning Guide for Physics*, Ministry of Education, 2010 at http://seniorsecondary.tki.org.nz.

This standard is also derived from *Te Marautanga o Aotearoa*. For details of *Te Marautanga o Aotearoa* achievement objectives to which this standard relates, see the Papa Whakaako for the relevant learning area.

2 *Demonstrate understanding* involves showing an awareness of how simple facets of phenomena, concepts, or principles relate to a given situation.

Demonstrate in-depth understanding involves giving explanations for phenomena, concepts, or principles that relate to a given situation.

Demonstrate comprehensive understanding involves connecting concepts or principles that relate to a given situation.

3 *Mechanical systems* include mathematical solutions and/or written descriptions. Written descriptions may include graphs or diagrams.

4 Assessment is limited to a selection from the following:

Translational Motion
Centre of mass (1 and 2 dimensions); conservation of momentum and impulse (2 dimensions only).

Circular Motion and Gravity
Velocity and acceleration of, and resultant force on, objects moving in a circle under the influence of 2 or more forces, Newton's Law of gravitation, satellite motion.

Rotating Systems
Rotational motion with constant angular acceleration; torque; rotational inertia; conservation of angular momentum; conservation of energy.

Oscillating Systems
The conditions for Simple Harmonic Motion, angular frequency, variation of displacement, velocity and acceleration with time, phasor diagrams, reference circles, damped and driven systems, resonance, conservation of energy.

Relationships

$d = r\theta$ $\quad v = r\omega$ $\quad a = r\alpha$ $\quad \omega = \frac{\Delta\theta}{\Delta t}$

$\alpha = \frac{\Delta\omega}{\Delta t}$ $\quad \omega = 2\pi f$ $\quad E_{K(ROT)} = \frac{1}{2}I\omega^2$

$\omega_f = \omega_i + \alpha t$ $\quad \theta = \frac{(\omega_i + \omega_f)}{2}t$ $\quad \omega_f^{\,2} = \omega_i^{\,2} + 2\alpha\theta$ $\quad \theta = \omega_i t + \frac{1}{2}\alpha t^2$

$\tau = I\alpha$ $\quad L = mvr$ $\quad L = I\omega$ $\quad F_g = \frac{GMm}{r^2}$

$T = 2\pi\sqrt{\frac{l}{g}}$ $\quad T = 2\pi\sqrt{\frac{m}{k}}$

$y = A\sin\omega t$ $\quad v = A\omega\cos\omega t$ $\quad a = -A\omega^2\sin\omega t$ $\quad a = -\omega^2 y$

$y = A\cos\omega t$ $\quad v = -A\omega\sin\omega t$ $\quad a = -A\omega^2\cos\omega t$

$$x_{COM} = \frac{m_1x_1 + m_2x_2}{m_1 + m_2}$$

5 Assessment Specifications for this achievement standard can be accessed through the Physics Resources page found at http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/subjects/.

Replacement Information
This achievement standard replaced unit standard 6397 and AS90521.

Achievement Standard

Subject Reference	Physics 3.5				
Title	Demonstrate understanding of Modern Physics				
Level	3	**Credits**	3	**Assessment**	Internal
Subfield	Science				
Domain	Physics				
Status	Registered	**Status date**	4 December 2012		
Planned review date	31 December 2020	**Date version published**	17 November 2016		

This achievement standard involves demonstrating understanding of Modern Physics.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Demonstrate understanding of Modern Physics.	• Demonstrate in-depth understanding of Modern Physics.	• Demonstrate comprehensive understanding of Modern Physics.

Explanatory Notes

1 This achievement standard is derived from *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, Level 8. The standard is aligned to Physical inquiry and physics concepts in the Physical World strand and Communicating in science in the Nature of Science strand, and is related to the material in the *Teaching and Learning Guide for Physics*, Ministry of Education, 2010 at http://seniorsecondary.tki.org.nz.

This standard is also derived from *Te Marautanga o Aotearoa*. For details of *Te Marautanga o Aotearoa* achievement objectives to which this standard relates, see the Papa Whakaako for the relevant learning area.

2 *Demonstrate understanding* involves showing an awareness of how simple facets of phenomena, concepts, or principles relate to a given situation.

Demonstrate in-depth understanding involves giving explanations for phenomena, concepts, or principles that relate to a given situation.

Demonstrate comprehensive understanding involves demonstrating understanding of connections between concepts or principles that relate to a given situation.

3 Examples of phenomena, concepts, or principles of Modern Physics include:
- the Bohr model of the hydrogen atom: the photon; the quantisation of energy; discrete atomic energy levels; electron transition between energy levels; ionisation; atomic line spectra, the electron volt
- the photoelectric effect
- wave-particle duality
- qualitative description of the effects of the strong interaction and Coulombic repulsion, binding energy and mass deficit; conservation of mass-energy for nuclear reactions
- qualitative treatment of special and general relativity
- qualitative treatment of quarks and leptons.

4 Conditions of Assessment related to this achievement standard can be found at www.tki.org.nz/e/community/ncea/conditions-assessment.php.

Replacement Information
This achievement standard replaced unit standard 6396 and AS90522.

Quality Assurance

1 Providers and Industry Training Organisations must have been granted consent to assess by NZQA before they can register credits from assessment against achievement standards.

2 Organisations with consent to assess and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Consent and Moderation Requirements (CMR) reference 0233

Achievement Standard

Subject Reference	Physics 3.6				
Title	Demonstrate understanding of electrical systems				
Level	3	**Credits**	6	**Assessment**	External
Subfield	Science				
Domain	Physics				
Status	Registered	**Status date**	4 December 2012		
Planned review date	31 December 2020	**Date version published**	17 November 2016		

This achievement standard involves demonstrating understanding of electrical systems.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Demonstrate understanding of electrical systems.	• Demonstrate in-depth understanding of electrical systems.	• Demonstrate comprehensive understanding of electrical systems.

Explanatory Notes

1 This achievement standard is derived from *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, Level 8. The standard is aligned to Physical inquiry and physics concepts in the Physical World strand and Communicating in science in the Nature of Science strand, and is related to the material in the *Teaching and Learning Guide for Physics*, Ministry of Education, 2010 at http://seniorsecondary.tki.org.nz.

This standard is also derived from *Te Marautanga o Aotearoa*. For details of *Te Marautanga o Aotearoa* achievement objectives to which this standard relates, see the Papa Whakaako for the relevant learning area.

2 *Demonstrate understanding* involves showing an awareness of how simple facets of phenomena, concepts, or principles relate to a given situation.

Demonstrate in-depth understanding involves giving explanations for phenomena, concepts, or principles that relate to a given situation.

Demonstrate comprehensive understanding involves connecting concepts or principles that relate to a given situation.

3 *Electrical systems* include mathematical solutions and/or written descriptions. Written descriptions may include graphs or diagrams.

4 Assessment is limited to a selection from the following:

Resistors in DC Circuits
Internal resistance; simple application of Kirchhoff's Laws.

Capacitors in DC Circuits
Parallel plate capacitor; capacitance; dielectrics; series and parallel capacitors; charge/time, voltage/time and current/time graphs for a capacitor; time constant; energy stored in a capacitor.

Inductors in DC Circuits
Magnetic flux; magnetic flux density; Faraday's Law; Lenz's Law; the inductor; voltage/time and current/time graphs for an inductor; time constant; self inductance; energy stored in an inductor; the transformer.

AC Circuits
The comparison of the energy dissipation in a resistor carrying direct current and alternating current; peak and rms voltage and current; voltage and current and their phase relationship in LR and CR series circuits; phasor diagrams; reactance and impedance and their frequency dependence in a series circuit; resonance in LCR circuits.

Relationships:

$E = \frac{1}{2}QV$ $\quad Q = CV$ $\quad C = \frac{\varepsilon_o \varepsilon_r A}{d}$ $\quad C_T = C_1 + C_2 + \mathrm{K}$ $\quad \tau = RC$

$\frac{1}{C_T} = \frac{1}{C_1} + \frac{1}{C_2} + \mathrm{K}$ $\quad \phi = BA$ $\quad \varepsilon = -L\frac{\Delta \mathrm{I}}{\Delta t}$ $\quad \varepsilon = -\frac{\Delta \phi}{\Delta t}$

$\frac{N_p}{N_s} = \frac{V_p}{V_s}$ $\quad E = \frac{1}{2}L\mathrm{I}^2$ $\quad \tau = \frac{L}{R}$

$\mathrm{I} = \mathrm{I}_{MAX} \sin \omega t$ $\quad V = V_{MAX} \sin \omega t$ $\quad \mathrm{I}_{MAX} = \sqrt{2}\,\mathrm{I}_{rms}$

$V_{MAX} = \sqrt{2}V_{rms}$ $\quad X_C = \frac{1}{\omega C}$

$X_L = \omega L$ $\quad V = \mathrm{I}Z$ $\quad \omega = 2\pi f$

$f_0 = \frac{1}{2\pi\sqrt{LC}}$

5 Assessment Specifications for this achievement standard can be accessed through the Physics Resources page found at http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/subjects/.

2022 PHY301 – Student Guide to Bibliographies / Referencing

A bibliography is the 'trail' of reading that you did to inform your thinking for your essay or assignment. A bibliography is organised alphabetically by the author's last name.

Setting up a bibliography APA style:

Item	Reference list entries	In text citation
Book **one author**	Pilger, J. (2006). *Freedom next time*. London, England: Bantam.	(Pilger, 2006) or ... Pilger (2006).
Book **two authors**	Shaw, R., & Eichbaum, C. (2008). *Public policy in New Zealand: Institutions, processes and outcomes*. Auckland, New Zealand: Pearson Education.	(Shaw & Eichbaum, 2008) *or* According to Shaw and Eichbaum (2008) ...
Book **three - five authors**	Alred, G. J., Brusaw, C. T., & Oliu, W. E. (2009). *The business writer's handbook*. New York, NY: St Martin's Press.	*First citation:* (Alred, Brusaw, & Oliu, 2009) *Subsequent citations*: (Alred et al., 2009)
Book **six - seven authors**	Gazda, G. M., Balzer, F. J., Childers, W. C., Nealy, A. U., Phelps, R. E., & Walters, R. P. (2005). *Human relations development: A manual for educators* (7th ed.). Boston, MA: Pearson Educational.	(Gazda et al., 2005)
Website **html** **no date**	Flesch, R. (n.d.). *How to write plain English*. Retrieved April 12, 2009, from http://www.mang.canterbury.ac.nz/writing_guide /writing/flesch.shtml	(Flesch, n.d.)
Website **PDF**	Radio New Zealand. (2008). *Annual report 2007-2008*. Retrieved from http://static.radionz.net.nz/assets/pdf_file /0010/1796761/Radio_NZ_Annual_Report_2008.pdf	(Radio New Zealand, 2008)
Video **online**	Bellofolletti. (2009, April 8). *Ghost caught on surveillance camera* [Video file]. Retrieved from http://www.youtube.com /watch?v =Dq1ms2JhYBI&feature=related	(Bellofolleti, 2009)

De La Salle College
Assessment Result Appeal Form

Name: _____ Class: _____

Name/number of standard being appealed: _____

Subject: _____ Teacher who marked work: _____

Grade awarded for standard: _____

Date work returned to student: _____ Date of appeal:_____

Reason for appeal:

Student signature: _____ Caregiver's signature: _____

OFFICE USE ONLY

Teacher response:

HOF response:

Principal's Nominee response:

Final decision:

De La Salle College 2022

Absence From Internal Assessment

Application for Extension

Student: _____ Class: _____

Subject: _____ Teacher: _____

Assessment title: _____

Standard number: _____

Type of assessment activity *(test, practical, assignment etc).*

Date of assessment or due date: _____

Reason for application:

- ☐ Illness or injury: *medical certificate or a letter from parent / caregiver* must be attached.
- ☐ Family / personal trauma: documentation must be attached *(eg. a letter from parent / caregiver, counsellor or Dean).*
- ☐ School activity *(sporting or cultural)* _____

Signature of the teacher-in-charge of the activity: _____

Decision by Principal's Nominee:

- ☐ Extension granted, new due date: _____
- ☐ New assessment granted, new date: _____
- ☐ Compassionate consideration will be used to determine a grade. HOD / TIC to attach documentation of evidence used to determine the grade and the grade awarded.
- ☐ Application denied. Comment: _____

_____

The reason for this has been explained to me and I accept the decision.

Signed: _____ (Student) _____ (Teacher)