

Assessment Task Notification

RESPECT | RESPONSIBILITY | PERSONAL BEST



Faculty: Science	Course: Stage 6 - Year 11	Time allowed: 8 Weeks
Teacher: Mesina	Email: frank.mesina@det.nsw.edu.au	
Task number: 2	Title: Depth Study	
Year: 11	Due date: 18 August 2025	Weighting: 40%

Syllabus outcomes assessed:

PH11/12-1 Develops and evaluates questions and hypotheses for scientific investigations;

PH11/12-2 Designs and evaluates investigations in order to obtain primary and secondary data and information;

PH11/12-3 conducts investigations to collect valid and reliable primary and secondary data and information ;

PH11/12-4 selects and processes appropriate qualitative and quantitative data and information using a range of appropriate media

PH11/12-5 analyses and evaluates primary and secondary data and information

PH11/12-6 solves scientific problems using primary and secondary data, critical thinking skills and scientific processes

PH11/12-7 communicates scientific understanding using suitable language and terminology for a specific audience or purpose

PH11-9 describes and explains events in terms of Newton's Laws of Motion, the law of conservation of momentum and the law of conservation of energy;

21st Century and employment related skills:

<input checked="" type="checkbox"/>	Communication	<input checked="" type="checkbox"/>	Use of technology
<input checked="" type="checkbox"/>	Critical Thinking	<input checked="" type="checkbox"/>	Self-reflection and refinement
<input type="checkbox"/>	Creativity	<input checked="" type="checkbox"/>	Problem Solving
<input checked="" type="checkbox"/>	Collaboration	<input type="checkbox"/>	Initiative and Enterprise
<input checked="" type="checkbox"/>	Planning and Organising	<input type="checkbox"/>	Cross-Cultural Understanding

Task description:

Depth studies provide opportunities for students to pursue their interests in physics, acquire a depth of understanding, and take responsibility for their own learning. Depth studies promote differentiation and engagement, and support all forms of assessment, including assessment for, as and of learning. Depth studies allow for the demonstration of a range of Working Scientifically skills.

Your task is to research and summarise Module 2. You must answer every question in this task. They relate directly to a dot point in the syllabus. You can use dot points, diagram(s) or even a question and solution to answer each dot point.

This Depth Study will form part of your formal assessment and so must be completed as part of your course.

Note: This replaces the previous Task that was on the Assessment Schedule. (PH11-9 is being assessed not PH11 -10)

Assessment criteria: You will be assessed on your ability to: See attached criteria

Method of task submission:

To Library 18 August 2025 (Monday, Week 5, Term 3)
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Marking guidelines:

Grade	Descriptor	Mark
A		
B		
C		
D		
E		
N (Stages 5 and 6)		



PHYSICS

General Instructions

- Board approved calculators may be used
- Write using black or blue pen
- Draw diagrams using pencil/black pen
- Computer presented document acceptable
- Write your student name at the top of every page that you submit.

2025
Depth Study
Year 11 Dynamics
Exam Creation

Total Marks = 62
(40% of Course Assessment)

Attempt all Questions

STUDENT NAME _____

Year 11 Physics Depth Study 2025

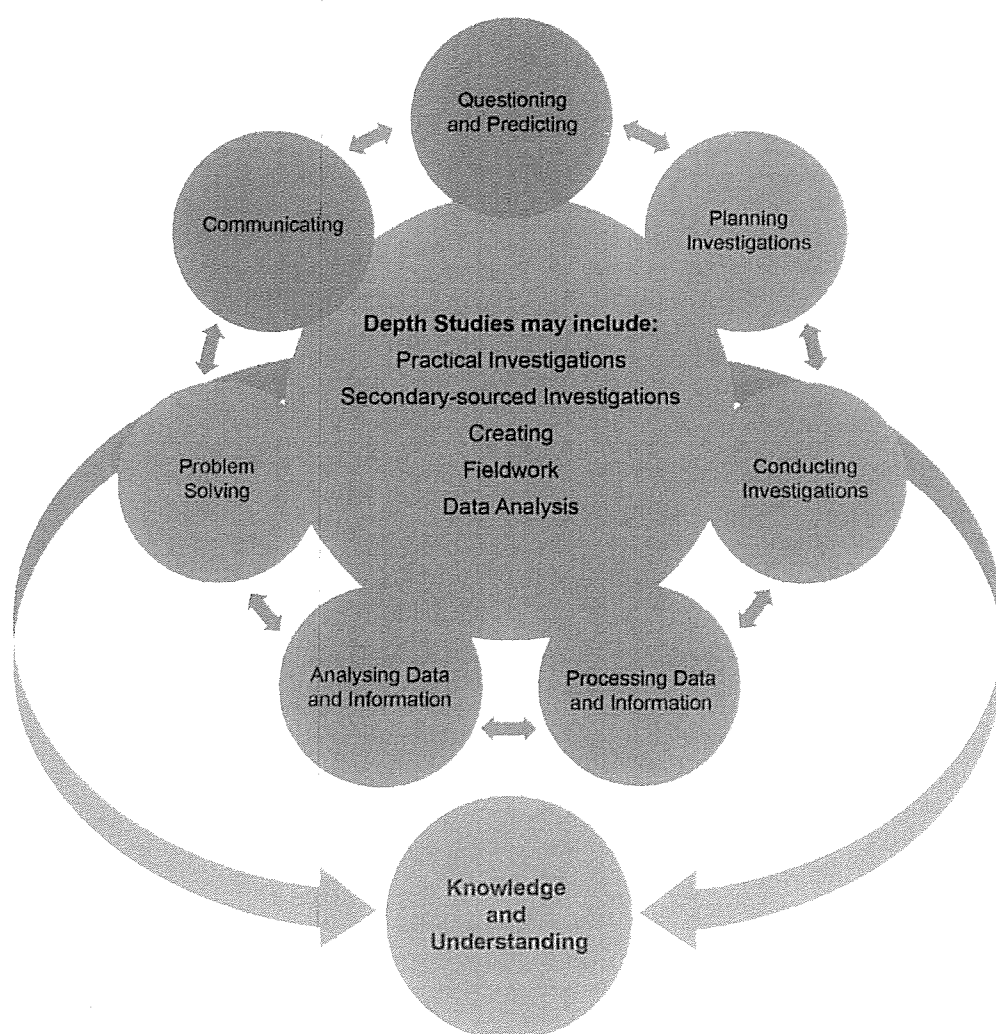
A depth study is any type of investigation/activity that a student completes individually or collaboratively that allows the further development of one or more concepts found within or inspired by the syllabus. It may be one investigation/activity or a series of investigations/activities.

Depth studies provide opportunities for students to pursue their interests in physics, acquire a depth of understanding, and take responsibility for their own learning. Depth studies promote differentiation and engagement, and support all forms of assessment, including assessment for, as and of learning. Depth studies allow for the demonstration of a range of Working Scientifically skills.

The length of time for any individual study and the pedagogies employed are not prescribed. The time for the depth studies may be allocated to a single study or spread over the year, and incorporate several studies depending on individual school and/or class requirements.

Requirements for Depth Studies

- A minimum of 15 hours of in-class time is allocated in both Year 11.
- At least one depth study must be included in Year 11.
- The two Working Scientifically outcomes of Questioning and Predicting and Communicating must be addressed in Year 11.



Assessment of Depth Studies must:

- address Questioning and Predicting, and Communicating skills outcomes
- address a minimum of two additional Working Scientifically skills outcomes
- include assessment of at least one Knowledge and Understanding outcome.

- A minimum of two additional Working Scientifically skills outcomes, and further development of at least one Knowledge and Understanding outcome, should be addressed in all depth studies.

Each of the seven Working Scientifically outcomes represents one of the interdependent dynamic processes that are central to the study of Science and the acquisition of scientific knowledge and skills. This course is structured to provide ongoing opportunities for students to implement these processes, particularly through the depth study provision. The following descriptions of the Working Scientifically outcomes provide further information about the skills students are expected to develop throughout the course.

Your Task:

1. You are to construct an exam that has multiple choice questions, Short answer or problem solving questions based on the second topic Dynamics.
2. You will have to provide an answer key for the exam you prepare.
3. There must be at least FOUR (4) problem solving/calculation questions. The rest can be multiple choice.
4. This Depth Study will not form part of your formal assessment, but must be completed as part of your course.

This task is due Monday Week 5 -Term 3, 18 August 2025, to Library by 8:20am.

Dynamics

The relationship between the motion of objects and the forces that act on them is often complex. However, Newton's Laws of Motion can be used to describe the effect of forces on the motion of single objects and simple systems. This module develops the key concept that forces are always produced in pairs that act on different objects and add to zero.

By applying Newton's laws directly to simple systems, and, where appropriate, the law of conservation of momentum and law of conservation of mechanical energy, students examine the effects of forces. They also examine the interactions and relationships that can occur between objects by modelling and representing these using vectors and equations.

















In many situations, within and beyond the discipline of physics, knowing the rates of change of quantities provides deeper insight into various phenomena. In this module, the rates of change of displacement, velocity and energy are of particular significance and students develop an understanding of the usefulness and limitations of modelling.

Your Task:

1. You are to construct an exam that has multiple choice questions, Short answer or problem solving questions based on the second topic Dynamics.
2. You will have to provide an answer key for the exam you prepare.
3. There must be at least FOUR (4) problem solving/calculation questions. The rest can be multiple choice.
4. This Depth Study will not form part of your formal assessment, but must be completed as part of your course.

This task is due Monday Week 5 -Term 3, 18 August 2025, to Library by 8:20am.

Your task requires you to make a

- Three (3) questions based on Newton's Laws of Motion,
- One (1) question describe interactions between two or more objects and the changes that result from:
 - a contact force
 - a force mediated by fields
- A Question that analyses net force simple two-dimensional situations using: vector addition (ACSPH050)  
- Two (2) Questions that analyse the following relationships:  
 - $\vec{F}_{AB} = -\vec{F}_{BA}$
 - $F_x = F\cos\theta, F_y = F\sin\theta$
- A Question that analyses Newton's first two laws of motion to the role played by friction $\vec{f}_{\text{friction}} = \mu\vec{F}_N$ (ACSPH063)  
- A Question that analyses the acceleration of a single object subjected to a constant net force and relate the motion of the object to Newton's Second Law of Motion through the use of: (ACSPH062, ACSPH063)
 - qualitative descriptions  
 - graphs and vectors  
- Two (2) Questions that apply the special case of conservation of mechanical energy to the quantitative analysis of motion involving:  
 - work done and change in the kinetic energy of an object undergoing accelerated rectilinear motion in one dimension $W = F_{\parallel}s = F\cos\theta$
 - changes in gravitational potential energy of an object in a uniform field $\Delta U = mg\Delta h$
- One question that analyses the law of conservation of momentum $\sum m\vec{v}_{\text{before}} = \sum m\vec{v}_{\text{after}}$
- One question that analyses conservation of kinetic energy $\sum \frac{1}{2}mv_{\text{before}}^2 = \sum \frac{1}{2}mv_{\text{after}}^2$, the results of interactions in elastic collisions (ACSPH066)  
- One question that analyses the relationship/information obtained from graphs of force as a function of time
- One question that analyses the effects of forces involved in collisions using the concept of impulse $\Delta\vec{p} = \vec{F}_{\text{net}}\Delta t$  

PHYSICS – Year 11 ASSESSMENT TASK

Depth Study - Task 2

Outcome	Question	Assessment Criteria	Marks				
			1	2	3	4	5
PH11-9	1	Question tests Newton's First Law (<i>and gives a correct answer</i>)	1	2			
PH11-9	2	Question tests Newton's Second Law (<i>and gives a correct answer</i>)	1	2			
PH11-9	3	Question tests Newton's Third Law (<i>and gives a correct answer</i>)	1	2			
PH11-9	4	Question tests interactions between objects that result from a contact force (<i>and gives a correct answer</i>)	1	2			
PH11-9	5	Question tests interactions between objects that result from a force mediated by fields (<i>and gives a correct answer</i>)	1	2			
PH11-9	6	Question tests 2D vector addition (<i>and gives a correct answer</i>)	1	2			
PH11-9	7	Question tests $\vec{F}_{AB} = -\vec{F}_{BA}$ (<i>and gives a correct answer</i>)	1	2			
PH11-9	8	Question tests $F_x = F\cos\theta$ or $F_y = F\sin\theta$ (<i>and gives a correct answer</i>)	1	2			
PH11-9	9	Question tests $\vec{f}_{\text{friction}} = \mu\vec{F}_N$ (<i>and gives a correct answer</i>)	1	2			
PH11-9	10	Question tests motion of an object under constant net force and Newton's Second Law - graphically (<i>and gives a correct answer</i>)	1	2			
PH11-9	11	Question tests motion of an object under constant net force and Newton's Second Law – using vectors (<i>and gives a correct answer</i>)	1	2			
PH11-9	12	Question tests $W = F_{\parallel}s = F\cos\theta = \text{change in Kinetic Energy}$ (<i>and gives a correct answer</i>)	1	2			
PH11-9	13	Question tests $\Delta U = mg\Delta h$ (<i>and gives a correct answer</i>)	1	2			
PH11-9	14	Question tests $\sum m\vec{v}_{\text{before}} = \sum m\vec{v}_{\text{after}}$; conservation of momentum (<i>and gives a correct answer</i>)	1	2			
PH11-9	15	Question tests $\sum \frac{1}{2}mv_{\text{before}}^2 = \sum \frac{1}{2}mv_{\text{after}}^2$; conservation of Kinetic energy (<i>and gives a correct answer</i>)	1	2			
PH11-9	16	Question tests graphs of force as a function of time (<i>and gives a correct answer</i>)	1	2			
PH11-9	17	Question tests the concept of impulse $\Delta\vec{p} = \vec{F}_{\text{net}}\Delta t$ (<i>and gives a correct answer</i>)	1	2			
PH11/12-1		<i>Develops</i> and <i>evaluates</i> questions for scientific investigation	1	2	3	4	
PH11/12-2		<i>Designs</i> and <i>evaluates</i> questions in order to obtain primary and secondary data and information	1	2	3	4	
PH11/12-3		<i>Evaluates</i> investigations as valid and reliable primary and secondary data and information	1	2	3	4	
PH11/12-4		<i>Selects</i> and <i>processes</i> appropriate qualitative and quantitative data and information using a range of appropriate media	1	2	3	4	
PH11/12-5		<i>Analyses</i> and <i>evaluates</i> primary and secondary data and information	1	2	3	4	
PH11/12-6		<i>Solves</i> scientific problems using primary and secondary data, critical thinking skills and scientific processes	1	2	3	4	
PH11/12-7		<i>Communicates</i> scientific understanding using suitable language and terminology for a specific audience or purpose	1	2	3	4	
		1 = developing; 2= shows research; 3 = consistent; 4 = highly developed	Total: / 62				