Gymea Technology High School
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Year 11, Physics

Task 3: Waves Depth Study

Due Date: Week 3A, Term 3, Friday 8th August 2025

Task Distributed: Tuesday 22nd July

Unit: Module 3: Waves and Thermodynamics

Task Type: Depth Study (Research and Practical)

Task Weighting: 30%

Outcomes: PHY11/12-1, PHY11/12-2, PHY11/12-3, PHY11/12-4, PHY11/12-5, PHY11/12-6, PHY11/12-7, PH11-10

Task Description

In this task, students will conduct individual research and an in-class first-hand investigation, during the allocated Depth Study hours.

Students will:

- First research to design and then safely perform a first-hand investigation to gather data, observations and inferences on sound waves and determine which common material will be most effective at soundproofing an area.

- Investigate and compare the quantitative effects of changing (a) material type and (b) material thickness on the level of sound insulation provided by a range of materials.

- Use the information from secondary sources and first-hand investigation to communicate their findings scientifically, in the form of a scientific report.

- Students will be allocated Physics lessons throughout weeks 1-3 of Term 3 to plan and conduct a first-hand investigation. They will be required to work on this task individually. Upon completion of their investigation, students will compose a practical report for submission.

NESA Glossary of Key Words

Understand the verb associated with the task. The verb will provide an understanding of the detail needed to successfully answer the question.

- **Calculate:** Ascertain/determine from given facts, figures or information
- **Explain**: Relate cause and effect; make the relationships between things evident; provide why and/or how
- **Analyse**: Identify components and the relationship between them; draw out and relate implications

Check the NESA Glossary of Key Words for further guidance https://educationstandards.nsw.edu.au/wps/portal/nesa/11-12/hsc/hsc-student-guide/glossary-keywords

Details of Submission

The following items are to be submitted:

A typed scientific report, using correct scientific format by **3pm Friday 8th August**
The report must be submitted on or before **Friday 8th August** in the following ways:

A **hard copy** to your class teacher (**by 3 pm**)
And
As an **electronic copy** on Google Classroom.

Teacher Feedback and Student Self-Reflection

- The task will typically be returned to students within 14 days of the due date.
- At this time feedback including information on how to improve will be provided through mechanisms such as marking criteria, and/or written comments.
- Students can clarify or seek further feedback by speaking with their teacher or the assessment marker.
- You will also receive feedback on your literacy performance based on the criteria in the school's literacy marking rubric. The marks achieved for literacy will account for between 10% – 20% of the maximum task value.

Upon return of the task, students will also be expected to complete a self-reflection.

At the time students receive their assessment mark and teacher feedback, students will be required to complete a self-reflection worksheet. Self-reflection is an important part of the learning process as it provides an opportunity to reflect on the strength of our performance, as well as areas that have been identified to strengthen in future tasks.

How does this link to my learning?

Student's knowledge, skills and understanding in the following modules will be assessed within this skills assessment task:

- Module 3: Waves and Thermodynamics

Assessment Procedures

All students should be fully aware of the School Assessment Procedures for their year group. These were provided at the beginning of the school year and are available off the school website under the Learning Tab for each year group.

Task Requirements

Part 1: Planning/Research

During the allocated depth study lessons, you will be required to conduct research into soundproofing and types of sound proofing material. This research should focus on the behaviour of sound waves when interacting with different mediums/materials. This information should be collected and stored in your research notes and used in the **introduction** section of the scientific report.

Include the following in your general plan:

- Background research (you will need to reference your sources in Part 5)
- Aim
- Hypothesis
- Independent, dependent, and controlled variables
- Risk assessment
- Equipment
- Procedure

Part 2: Conducting

Part 2 involves the collection of your valid and reliable data. This data should be collected **during class when conducting your investigation.**

- **Quantitative** (recorded numerical) data
- Use appropriate **technologies/equipment** to ensure accuracy and reliability.

Part 3 - Analysing

Part 3 will involve you analysing and evaluating the data you collected in Part 2.

- Description of how reliability is addressed
- Description of how validity is addressed
- Explaining trends and patterns by the construction and analysis of graphs
- Discussion of how your collected data impacts on and relates to soundproofing

Part 4 - Problem Solving

Part 4 allows you to solve problems encountered during your investigations by using critical thinking skills and the scientific method.

- Identifies problems encountered & discusses how these were overcome
- Links primary and secondary data to make future predictions
- Draws appropriate conclusions consistent with collected data

Part 5 - Communicating

Part 5 is how you will communicate your findings.

- Use of scientific language/terminology
- Presentation of the depth study including formatting
- Select and use of suitable forms of digital, visual and written communication at a level suitable to targeted audience (the scientific community)
- Use of labelled images/diagrams
- References from a variety of sources (Oxford/Harvard referencing)

On the due date you will required to submit a scientific report based on your investigation.
Your scientific report must contain the following:

- Title
- Introduction
- Aim
- Hypothesis
- Variable list
- Equipment list
- Risk assessment
- Method
- Results (Qualitative and Quantitative)
- Discussion
- Conclusion
- Reference list

Use **Harvard** referencing throughout your scientific report. For referencing assistance, view the Harvard referencing guide on Google Classroom.

Marking Guidelines

Outcome	Indicator	Experiencing Difficulty	Developing	Competent	Outstanding	Mark
Part 1 Planning **PH11-10** **11/12-1** **11/12-2** Develops and evaluates questions to obtain primary and secondary data and information	Introduction (Background Research)	No research	Simplistic research	Research addresses part of investigation	Research addresses all scientific aspects of the investigation	
		0	2	4	6	
	Aim	No aim	Aim included, but unclear	Aim is stated clearly		
		0	1	2		
	Hypothesis	No hypothesis	Hypothesis included, but unclear	Hypothesis is stated clearly		
		0	1	2		
	Independent Variable	No variable	Correctly identifies variable			
		0	1			
	Dependent Variable	No variable	Correctly identifies variable			
		0	1			
	Controlled Variables	No variables	Some controlled variables included	All control variables included		
		0	1	2		
	Risk Assessment	No risk assessment	Identifies one hazard	Identifies 2 hazards	Identifies 3 or more hazards and how they will be overcome	
		0	1	2	4	
	Equipment	No equipment list	Equipment list incomplete	Complete equipment list		
		0	1	2		
	Procedure	No procedure	Procedure is included, but difficult to understand	Procedure mostly correct, with minor errors	Procedure is written in a logical order	
		0	2	4	6	

Part 2 **Conducting** **11/12-3** Collects valid and reliable data.	Collects qualitative data	No qualitative data	Basic description of observations	Detailed description of most observations	Detailed description of all observations	
		0	1	2	3	-1 mark no units
	Collects quantitative data	No quantitative data	Some data	All quantitative data, minor errors	All quantitative data included	-1 mark no units -1 mark no units
		0	1	2	3	
	Accuracy	Not addressed	Uses some appropriate technology/equipment	Uses all appropriate technology/equipment		-1 mark no units
		0		2		
	Reliability	No addressed	Some results repeated	All results repeated	All results repeated, outliers discounted	
		0	1	2	3	
Part 3 **Analysing/Discussion** **11/12-4** **11/12-5** Processes, analyses and evaluates primary and secondary data	Reliability	Not addressed	Basic description of how reliability was addressed	Detailed description of how reliability was addressed		
		0	1	2		
	Validity	Not addressed	Basic description of how validity was addressed	Detailed description of how validity was addressed		
		0	1	2		
	Trends and relationships	Not addressed	Identifies pattern that uses some data	Identifies pattern that uses all data	Explains patterns/relationships across all data	
		0	1	2	3	
	Discussion of sound waves	No Discussion sound waves	Discussion of sound waves but does not relate to investigation	Basic discussion of sound waves and how it relates to investigation	Detailed discussion of sound waves and how it relates to investigation	
		0	2	4	6	

Part 4 **Problem Solving** **11/12-6** Solves a range of scientific problems using data and critical thinking skills	Problems encountered	Not included	Identifies one problem	Identifies two problems	Identifies three problems	
		0	1	2	3	
	Problems analysed	Not included	Discusses how one problem was overcome	Discusses how two problems were overcome	Discusses how three problems were overcome	
		0	1	2	3	
	Primary and secondary data	Not included	Fails to correctly link primary and secondary data	Correctly links primary and secondary data	Correctly links primary and secondary data and uses to make future predictions	
		0	1	2	3	
	Conclusion	Not included	Included, but not relevant to aim	Included and relevant to aim		
		0	1	2		
Part 5 **Communicating** **11/12-7** Communicates scientific understanding for a specific audience	Scientific language/terminology	Basic/incorrect use of terminology	Correct use of terminology with minor errors	Effective use of scientific terminology		
		0	1	2		
	Presentation	Handwritten	Formatting used, but ineffective	Formatting improves the assessment		
		0	1	2		
	Communication	Poorly communicated	Communicated effectively, but not appropriate for audience	Communicates effectively to targeted audience		
Referencing		0	1	2		
	Images/diagrams	Not included	Images/diagrams included, but not relevant	Images/diagrams included and relevant	Images/diagrams included, relevant, and labelled	
		0	1	2	3	
	References - Number	Not included	1-2 References	Up to 4 references included	6 or more included	
		0	1	2	3	
	References - sources	Not included	Included referencing from one type of source	Included referencing from two types of sources	Included referencing from three types of sources	
		0	1	2	3	

	References - formatting	Not included	Incorrectly formatted references	Correctly formatted references		
		0	1	2		
				TOTAL		**/78**