



CHRISTCHURCH BOYS' HIGH SCHOOL

STUDENT STUDY TOOLS 2026

**SOLO TAXONOMY, ACADEMIC
VERBS and the SCIENCE OF
LEARNING**

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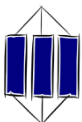
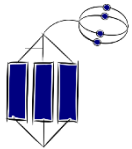
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SOLO TAXONOMY

NCEA uses the language of SOLO Taxonomy to tell us what Achieved, Merit or Excellence level work looks like.

Understanding the academic verbs in SOLO can help you understand what stage of learning you are at, and how to move into the next stage.

If you have ever asked, "How do I improve my grades?", SOLO Taxonomy has the answer.

LEARNING STAGE	TECHNICALLY	IN PLAIN WORDS	ACADEMIC VERBS	
PRESTRUCTURAL 	The learner has minimal understanding and cannot connect ideas.	"I don't know anything about this".		
UNISTRUCTURAL 	The learner understands one relevant aspect and can perform simple reasoning	"I know one thing by itself".	Define Label Find	Identify Name Match
MULTISTRUCTURAL 	The learner understands several independent aspects but cannot integrate them. ACHIEVED	"I know several things, but I don't understand how they work together".	Describe Outline Calculate Demonstrate	List Combine Compute Organise
RELATIONAL 	The learner can integrate multiple aspects into a coherent whole and draw conclusions. MERIT	"I know several things and understand how they work together".	Sequence Explain Contrast Relate	Classify Compare Analyse Apply
EXTENDED ABSTRACT 	The learner can generalise and apply understanding to new contexts, creating new knowledge. EXCELLENCE	"Actually, I know and understand that but can think of a different way to look at it".	Generalise Evaluate Create Theorise Argue	Predict Reflect Hypothesise Justify Prove

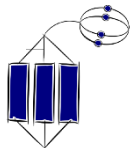
For example, if I am getting a lot of Achieved grades because I can **DESCRIBE**, I might need to improve how I **ANALYSE** or **EXPLAIN** a concept to move into Merit.

For example, if I am getting a lot of Merit grades because I can **ANALYSE**, I might need to improve how I **EVALUATE** a concept or how I **JUSTIFY** a conclusion to move into Excellence.

The pages that follow attempt to help you understand what the academic verbs in each particular subject mean and how you can show them.

GENERAL ACADEMIC VERBS- a starting point for Years 9-10

Before we get into subject specific academic verbs, here are some basic definitions to get you started. You will often see these words in assessments in Year 9 and 10.

LEARNING STAGE	ACADEMIC VERBS
PRESTRUCTURAL "I don't know anything about this". 	School based assignments and tasks will often use the words listed below. As you move down the table, you will notice that doing the action required by the verb becomes progressively more difficult. This shows how your learning is progressing.
UNISTRUCTURAL "I know one thing by itself". 	Define - Give the meaning of a word, term, or idea. Identify - Recognise and name something. Find - Locate or work out the correct answer or information.
MULTISTRUCTURAL "I know several things, but I don't understand how they work together". 	Describe - Give the main features, characteristics, or details of something. List - Write down a series of items without explanation. Organise - Arrange information in a clear and logical way.
RELATIONAL "I know several things and understand how they work together". 	Explain - Make something clear by giving reasons or showing how or why it happens. Compare - Show the similarities between two or more things. Contrast - Show the differences between two or more things. Analyse - Break something into parts and explain how those parts work together.
EXTENDED ABSTRACT "Actually, I know and understand that but can think of a different way to look at it". 	Generalise - Use specific examples to make a broader statement or rule. Predict - Suggest what is likely to happen based on evidence or information. Evaluate - Judge the value, quality, effectiveness, or importance of something using evidence. Justify - Give reasons and evidence to support an answer, opinion, or decision.

Level One Sciences (Chemistry, Biology, Physics, Earth and Space Sciences)

Analyse	Break information into parts and examine relationships, causes, patterns, or trends and the significance between the parts. Students must go beyond describing and explain what the data means, supported by examples. <i>Example: "Analyse the graph showing plant growth at different temperatures." → Plant growth increases as temperature rises to 25°C, then decreases. This suggests enzymes involved in growth work best near 25°C but are less effective at higher temperatures.</i>
Compare	Provide specific evidence of how two (or more) factors are the same AND different. Provide evidence of what is the same AND what is different between two factors. <i>Example: Ep and Ek are similar because both are types of energy, however the factors that influence how much Ep and Ek are different because...</i>
Define	Give the exact meaning of a word or concept. Usually short, precise, and scientific. <i>Example: "Define photosynthesis." → Photosynthesis is the process by which plants use light energy to convert carbon dioxide and water into glucose and oxygen.</i>
Describe	Give the characteristics, features, or details of something. State what you see or know without explaining why. <i>Example: "Describe the appearance of the precipitate." → The precipitate is a pale blue colour.</i>
Discuss	Explore an issue from more than one viewpoint, including evidence, advantages, disadvantages, or implications. This requires significant detail of the concepts, effectively linked together into an extended and cohesive response <i>Example: "Discuss the use of fossil fuels for energy." → In summary, fossil fuels provide reliable energy and are relatively cheap, but they are a finite resource and release greenhouse gases when burned that contribute to climate change, therefore their use must be reduced from the current rate of consumption.</i>
Explain	Give reasons or causes; tell how or why something happens. This is one of the most important science verbs. It requires a statement, with justification following, using a 'because' or similar linking term <i>Example: "Explain why exercise increases breathing rate." → Exercise increases breathing rate because muscles need more oxygen for respiration and produce more carbon dioxide that must be removed.</i>
Evaluate	Make a judgement about the value, reliability, effectiveness, or quality of something using evidence. This requires an extended and detailed analysis. The student must review a method or idea, analyse sources of error, and determining if the evidence is strong enough to support conclusion of ideas with comparison to ... <i>Example: "Evaluate the investigation method." → The method was reliable because it was repeated three times, but accuracy may have been affected because the temperature was not controlled.</i>
Identify	Name, recognise, label, or select the correct item. Brief and simple, requires minimal detail. <i>Example: "Identify the independent variable." → The independent variable is the temperature of the water.</i>
Observations	Information gathered using the senses or measuring equipment. Observations are what is seen, heard, measured, or recorded. No explanation is required for this. <i>Example: The solution changed from blue to green and the temperature increased by 5°C.</i>

Level Two and Three Biology

Analyse the relationship	Examine the evidence and relate the information to several biological ideas
Compare and contrast	To identify similarities between several factors and highlight their differences.
Demonstrate	Defining, using annotated diagrams or models to explain, and giving characteristics of, or an account of, a process
Demonstrate in-depth	Providing reasons as to how or why biological ideas and processes occur
Demonstrate comprehensively	Linking several biological ideas to the context of the resource. This may involve explanations, justifying, relating, evaluating, comparing and contrasting, or analysing
Describe	To demonstrate/state the features or characteristics of
Discuss	Give an account of the importance of a range of factors or arguments when making a comparison of alternatives
Evaluate	Assess the limitations and implications
Explain	Require a long answer or a series of sentences in the form of an explanation, giving reasons why or how something occurs
Explain the relationship	Linking a change or process to a biological idea
Explanations	Have linking words in them such as "because", "therefore", "so that", "this means that"
Justify	Give biological evidence and reasoning to support a conclusion, showing <i>why</i> something happens and <i>why that explanation is the most valid or important one</i>
Investigate	Describing observations or findings, and using those findings to identify the patterns
Investigate in-depth	Providing a reason for how or why the pattern relates to selection pressures
Investigate comprehensively	Reasoning the interrelated patterns with biological knowledge

Level Two and Three Physics

Calculate	State assumptions -->Select the right equation --> show the equation --> rearrange equation correctly -->substitute values correctly --> solve --> round answer appropriately -->give units. Show that the distance travelled by a car who travels at 9.3ms for 13.5 seconds is 123.6m. Since the forces acting on the car are all balanced, the acceleration of the car will be zero. $v = \frac{\Delta d}{\Delta t} \text{ so } \Delta d = v\Delta t$ $= 9.3 \times 13.5$ $= 125.55m$
Demonstrate comprehensive understanding	This involves linking ideas to integrate physics relevant to the selected context, and involves elaborating, justifying, relating, evaluating, comparing and contrasting, or analysing the physics underpinning the context or given situation. This may also involve writing statements that demonstrate understanding of connections between concepts.
Discuss	Use an explanation to make a prediction, conclusion, or analogy to another topic. Hubble's Law says that the further a galaxy is away from Earth the faster it will be moving. Discuss how the Doppler Effect might be used to observe Hubble's Law. If a galaxy is moving away from Earth, light from that galaxy will be "red-shifted" (i.e., have a longer apparent wavelength). If Hubble's Law is true, then the light from more distant galaxies will be more red-shifted than that light from nearer galaxies. This is because the amount of red-shift is proportional to the speed of the source (the moving galaxy).
Explain	Write a paragraph linking facts together with the effect/observation, a diagram or calculation might help. Explain whether the pitch will rise or drop as it passes the observer. The pitch will drop. Since the car is producing a constant pitch, but the source is now moving away from the observer, the same number of waves will exist in a larger space. This creates an apparent increase in wavelength and thus a lower pitch.
Justification	A justification is a reasoned explanation that shows why an answer, conclusion, or choice is valid, using physics principles, evidence, and/or calculations.
Show	Use the given information to calculate a given answer (credit for working only). Show that the distance travelled by car a runner who travels at 9.3ms for 13.5 seconds is 123.6m. Since the forces acting on the car are all balanced, the acceleration of the car will be zero. $v = \frac{\Delta d}{\Delta t} \text{ so } \Delta d = v\Delta t$ $= 9.3 \times 13.5$ $= 125.55m$
State/Describe	Identify the object, quantity, or event. State the name of the phenomenon which causes the sound of a passing car to change pitch as it passes an observer. The Doppler Effect

Level Two and Three Chemistry

Analyse	Break into key parts and explain using the Chemistry concept being questioned.
Calculate	Use a formula to process and calculate a value - usually requires presentation with 2 - 4 sig. fig. and units.
Compare	Name or identify all the things that are the same, and all the things that are different for two chemical situations / examples.
Contrast	Describe all the things that are different for two linked chemical situations or examples.
Describe	State, name, or give an account of a chemistry idea or relationship.
Determine	Find out something new using multiple steps. Determine the concentration of H_2SO_4
Discuss	Write an explanation with reasons and examples for a chemical conclusion or a chemical principle being referred to.
Elaborate	Give extra detail or information when discussing an example or idea in Chemistry.
Evaluate	Look through in detail, compare to another situation and make judgement. <i>Using the provided bond angles determine the bond angles with explanation for carbon tetrachloride.</i>
Explain	State the reasons why a chemistry change or example has occurred.
Giving an account	Write a description of what something is like or a chemical happening that has occurred.
Identify Name State	Select or label a chemical thing that is presented or occurs, usually to describe it in a few words only.
Interpreting	Use information that has been provided and explain it's meaning in terms of the Chemistry ideas or concepts being illustrated.
Justify	Explain, using an example, the decision you have made, with good reason. <i>Using the provided redox couple electromotive potentials decide if the reaction between potassium permanganate and ferrous sulfate will occur and link the species to the reaction that occurs.</i>
Relate	Explain the connections between several chemistry ideas or concepts by linking how each part affects or explains the next and stitches together into an explanation for a more complex or interrelated understanding of the overall concept.

Level One English

Command attention	Command attention means making your reader or audience sit up, take notice, and stay interested because your writing or speaking is powerful, engaging, and memorable. It might include a striking image, question, or statement; use vivid and precise vocabulary; have a strong sense of 'voice'; use language features deliberately; and leave a lasting impression.
Define	A statement of the exact meaning of something, particularly specific words or terms.
Describe	Provide details - tell the who, what, when, where and how. Give detailed information about a character, place, event, idea, or text so the audience can clearly understand what it is like.
Develop and structure	Build on a single idea in a systematic and logical order. This means organising your ideas and adding explanations, evidence and analysis that moves beyond simple description.
Discuss	A strong discussion might be organised this way: • Describes relevant ideas or evidence. • Explains how and why they are important. • Considers different perspectives or interpretations. • Reaches a reasoned conclusion or judgement.
Draw conclusions	This involves bringing your main ideas together and reaching a final judgement or insight supported by evidence.
Explain	To give reasons for why and how something occurs along with supporting evidence and how ideas are connected.
Identify	Recognise specific characteristics or details; or name something.
Integrate insightful ideas	This involves combining different ideas, pieces of evidence, or perspectives into a coherent whole to show how they work together to support a single argument and how that might apply to a different context.
Support ideas	Provide a range of examples, quotes or evidence.

Level Two and Three English

Analyse	Tell me what the author did, how they did it and why they did it. This means breaking something into its parts, understanding how those parts work together and the effect they create.
Close analysis/reading	Break something down into its parts and explain the relationship between the parts. 'Close' requires detailed evidence from the raw material.
Command attention	Command attention means making your reader or audience sit up, take notice because you have deeply engaged, challenged, moved, or persuaded them. This is achieved by using striking imagery or language in a different way; by using vivid and precise vocabulary; by creating a distinct 'voice'; use language features that are polished, sophisticated, coherent and deliberate.
Controlled	Concise, planned, coherent, technically accurate and the deliberate use of language features.
Convincingly	This requires clear, organised ideas that are supported with relevant evidence or examples. The ideas are explained and remain focused on the question while following a reasoned sequence of conclusions that are persuasive.
Crafted	Deliberately editing, proofing, and taking the time to improve each sentence and word choice.
Develop	This involves ideas that have detail beyond the basics, and this is combined with explanation and evidence that supports and explores the significance and implications of the idea. This may also involve exploring links between ideas.
Discerning	This involves showing insight and good judgement by recognising important details, deeper meanings, or subtle differences that are beyond the obvious. This may recognise complexity, ambiguity and patterns allowing you to make thoughtful judgements and evaluations.
Discuss - extent	Investigate or examine an argument or debate. Provide reasons for and against, but to also examine the implications of the topic (evaluation/judgement); this is the 'extent' aspect. Reach an evaluative conclusion.
Evaluate	This involves reaching a clear judgement by exploring strengths and/or weaknesses alongside supporting evidence and an assessment of that evidence.
Form conclusions	Use information/facts to come up with new ideas and understanding.
Insight	To have a deep/clear understanding of a topic, idea or concept and its relevance beyond that context.
Integration	To combine two or more ideas and explain how they work together.
Interpretations	This requires you explains the ideas, messages, or meanings in a text beyond just describing them, while showing an awareness that different readers may have different, valid interpretations.
Judgements	Reach and justify a conclusion about the value, effectiveness, significance, or meaning of something using evidence and reasoning.
Perceptively	Show originality and insight in interpretation.
Respond critically	Involves developing an argument with evidence. Need to build the focus and scope of your argument. Critically requires evaluation and judgements.

Level One Geography

Analyse	To examine the nature or structure of something, especially by separating it into its parts, in order to understand or explain it.
Describe	This means to identify and give an account of; to make reference to the qualities, characteristics or recognisable features. A simple explanation can also be included.
Discuss	To talk or write about something in detail, considering different ideas and opinions related to it.
Examine	To look at in detail. Make connections between factors or ideas.
Explain	This means to provide reasons for, to account for, to provide a clear answer, to clarify. Logical reasons are provided.
Evaluate	To make a judgement based on criteria; determine the value with reasons.
Use evidence to support	Use material from case study, or from provided resources as evidence in your written response.

Level Two and Three Geography

Analyse	To examine the nature or structure of something, especially by separating it into its parts, in order to understand or explain it.
Describe	This means to identify and give an account of; to make reference to the qualities, characteristics or recognisable features. A simple explanation can also be included.
Discuss	To talk or write about something in detail, considering different ideas and opinions related to it.
Examine	To look at in detail. Make connections between factors or ideas.
Explain	This means to provide reasons for, to account for, to provide a clear answer, to clarify. Logical reasons are provided.
Evaluate	To make a judgement based on criteria; determine the value with reasons.
Use evidence to support	Use material from case study, or from provided resources as evidence in your written response.
Fully describe/explain	This means the response is complete and demonstrates an understanding of all facets. It incorporates relevant geographic concept(s) and uses appropriate geographic terminology.
Integrating case study evidence	Integrating refers to relevant examples being woven throughout the evidence to support explanations.
Showing insight/insightful	This involves showing a clear argument to complement your understanding. Insight can involve weighing up and judging evidence, linking factors to clearly show causal relationships and reading into and beyond the subject matter/evidence. Consideration of perspectives can help students to demonstrate insight.

Level One Commerce/Business/Accounting/Economics

Demonstrate understanding	<i>This involves:</i> • Describing the key idea(s) • Using correct terms and facts • Giving examples or evidence to support what you say
Examine	<i>This involves:</i> • Explaining the situation or concept • Explain how or why it happens (causes, effects, relationships) • Explore different aspects or perspectives • Use examples or evidence to support your thinking
Evaluate	<i>This involves:</i> • Analysing by breaking the idea or situation into parts to show what is happening and why • Discussing advantages and disadvantages, and looking at different viewpoints or impacts • Justifying your answer using evidence, examples, or reasoning, and explaining why one decision or idea is stronger • Make a judgement and give a clear conclusion as to why

Level Two and Three Accounting

Demonstrate understanding	<i>This involves:</i> • Describing the key idea(s)- what is happening in the business • Using correct terminology • Giving examples or evidence to support what you say
Demonstrate in-depth understanding	<i>This involves:</i> • Explaining why a concept is important to the business • Use examples or evidence to support your thinking
Demonstrate comprehensive understanding	This involves justifying how the concept benefits the business in the future and links to the consequences of not applying the concept.
Analyse	This involves breaking ideas into parts and examining relationships between them to identify patterns, connections, and significance.
Describe	This involves giving a clear, detailed account of the key features or characteristics.
Explain	This involves making something clear by giving reasons or showing how/why it happens. This requires you to move beyond description by thinking about cause → effects → implications.
Justify	This involves giving reasons and evidence to support a decision or conclusion and to make a judgment supported by evidence.

Level Two and Three Economics

Demonstrate understanding	<i>This involves:</i> • Describing the key idea(s) • Using correct terms and facts • Giving examples or evidence to support what you say
Demonstrate in-depth understanding	<i>This involves:</i> • Explaining the situation or concept • Explain how or why it happens (causes, effects, relationships) • Explore different aspects or perspectives • Use examples or evidence to support your thinking
Demonstrate comprehensive understanding	This involves justifying concepts and showing links between concepts and characteristics.
Analyse	This involves breaking ideas into parts and examining relationships between them to identify patterns, connections, and significance or impact.
Analyse comprehensively	This involves identifying causes by comparing and/or contrasting their impact on an issue, or on various groups in society, and by integrating changes shown on economic models into detailed explanations.
Compare	To identify what is similar.
Contrast	To identify what is different.
Describe	This involves giving a clear, detailed account of the key features or characteristics.
Explain	This involves making something clear by giving reasons or showing how/why it happens. This requires you to move beyond description by thinking about cause → effects → implications.
Identifying	Locate or state a specific piece of information or model or concept.
Integrating	This involves combining different ideas, pieces of evidence, or perspectives into a coherent whole to show how they work together to support a single argument This is not just linking ideas but blending them into one line of reasoning.
Justify	This involves giving reasons and evidence to support a decision or conclusion and to make a judgment supported by evidence.

Level Two and Three Business

Apply	This involves using a model or business concept precisely and purposefully to support decisions or strategies.
Compare	To identify what is similar.
Contrast	To identify what is different.
Evaluation	Discussing advantages and disadvantages, and looking at different viewpoints or impacts
Explain	Clearly state by giving reasons or showing how/why it happens. This requires you to move beyond description by thinking about cause → effects → implications of the complex problem and solution. This includes scale (global, regional, local, just the business) and timeframe (short term, medium term, long term). Integrate Māori Business concepts where appropriate.
Identifying	Locate or state a specific piece of information or model or concept.
Integrating	This involves combining different ideas, pieces of evidence, or perspectives into a coherent whole to show how they work together to support a single argument. This is not just linking ideas but blending them into one line of reasoning.
Justify	This involves giving reasons and evidence to support a decision or conclusion and to make a judgment supported by evidence. To address the problem this may require multiple solution(s) or strategies to mitigate the negative impact of a problem. This must be in the context of scale and timeframe.

Level One History

Demonstrate understanding	This means to describe (provide important details) and evidence in the description.
Engage with	This means to select a variety, to identify the relevance of and to identify strengths or limitations.
Examine	This means to make connections between ideas and reflect on strengths and limitations using evidence to develop an explanation.
Examine perspectives	This means discuss different perspectives (points of view) which may include consideration of values, beliefs, concepts, motivations, and experiences that inform actions or responses.
Explain	To give reasons for why and how something occurs along with supporting evidence.
Investigation	A systematic, purposeful process of collecting and evaluating evidence and making a conclusion.

Level Two and Three History and Classics

Analyse	Use historical evidence to make sound judgements regarding an event(s), evaluating causes and consequences, and justifying conclusions.
Carry out an inquiry	This involves: • preparing to carry out an inquiry • making annotations on the evidence • organising sources and evidence • evaluating the inquiry.
Comprehensively analyse	This involves: • presenting sound understanding and well-considered judgements of the evidence • forming conclusions from an historian's perspective • presenting arguments that are supported by comprehensive evidence drawn from primary and secondary sources.
Comprehensively examine	involves providing an insightful explanation of the causes and consequences of a significant event, using detailed supporting evidence.
Comprehensively interpret	This involves interpretations which show depth of understanding, and discernment, with significant relevant supporting evidence.
Comprehensively research,	This involves: • the gathering and selecting of relevant evidence, which may include persevering with difficult sources, and/or using evidence from sources which are not readily available, • critically evaluating the research process, for example by analysing the strength(s) and weakness(es) of the process, • analysing how these strength(s) and weakness(es) are likely to impact on the validity of the findings, • considering alternative research steps and/or line(s) of inquiry and/or methods, and their implications
Evaluate	Consider a range of evidence relating to an event to prioritise and make conclusions.
Examine	Communicate key ideas through explanation of an event and its significance, supported by historical evidence.
Primary	Evidence derived from the time period of an event. Could be newspapers, photos, statistics etc.
Secondary	Evidence that documents an event at a later time than the event. Could be books, documentaries etc.
Showing perceptive understanding	This involves 'reading between the lines' to draw conclusions that go beyond the immediately obvious, and/or to raise relevant questions (where appropriate) that demonstrate a high degree of engagement with the source. It could involve selecting and explaining evidence with an awareness of the limitations of either the evidence or the basis for making assumptions about it.
Significance	Assesses the importance of an event to peoples' lives at the time and after the event.

Level One Health

Demonstrate	Identify and describe the relevant factors or strategies, then describe how they influence or enhance Hauora using examples.
Explain	Explain how and why the factors or strategies are connected/interrelate. Show how they work together and support ideas with examples.
Evaluate	Make a justified judgement about the importance or effectiveness of factors or strategies. Consider different impacts before reaching a conclusion supported with evidence.

Level Two Health

Analyse	Explain health issues by identifying the key influences, the consequences for wellbeing, and health-enhancing strategies that promote wellbeing. Support your ideas with relevant evidence or examples.
Analyse in depth	Explain how and why the influences contribute to the consequences for wellbeing, and how the strategies relate to those influences. Use detailed evidence to show the significance of these relationships.
Analyse comprehensively	Make coherent connections between the influences, consequences, and strategies to demonstrate a critical understanding of the underlying health concepts. Draw well justified conclusions supported by evidence.

Level Three Health

Analyse	Explain an international health issue, its implications for the wellbeing of people and society, how the major determinants/factors of health influence the issue, and recommend strategies to improve equitable health outcomes. Support your analysis with relevant evidence.
Analyse in depth	Explain how and why the major determinants/factors of health influence the issue and its implications for wellbeing. Recommend strategies that respond to these relationships using detailed evidence.
Analyse perceptively	Develop a coherent and insightful analysis that connects the health issue, its implications, major determinants/factors of health, recommended strategies, and the underlying health concepts. Draw well justified conclusions that demonstrate a deep understanding, supported by consistent and relevant evidence.

Level One Physical Education

Apply (strategies)	This requires you to identify a range of strategies and demonstrate how you can use that range of strategies in an applied setting.
Sustain (strategies)	This requires you to identify a range of strategies and demonstrate consistently how you can use that range of strategies in an applied setting.
Execute (strategies)	This requires you to identify a range of strategies and demonstrate with intent and proficiency how you can use that range of strategies in an applied setting.
Demonstrate understanding	Involves describing influences or strategies and the reasons for applying an influence/influences or a strategy/strategies.
Identifying	Involves naming and labelling.
Describe	Describing an influence, strategy, outcome or event that has impacted on a situation.
Explain	Explaining how and why a strategy or influence applies, or the reasons an outcome or event has occurred, and the effect they have.
Evaluate	Evaluating an outcome or event and drawing conclusions about the effectiveness of how an influence/influences or strategy/strategies are applied, using examples.
Draw conclusions	To reflect and predict how and why something has an effect using evidence.

Level Two and Three Physical Education

Analyse comprehensively	Involves evaluating and reflecting on how strategies are applied and are relevant
Critically analyse	Involves: • breaking something down into its parts • discussing and evaluating which parts have the greatest impact • drawing conclusions (possibly about relevance and/or suitability)
Critically evaluate	Involves: • questioning and challenging assumptions • making coherent and insightful judgements • using those judgements to identify and justify modifications
Demonstrate comprehensive understanding	Involves evaluating how and why ideas or principles relate to each other and the interrelationship between them.
Devise strategies	Is the process by which knowledge is applied to meet an intended purpose and involves developing strategies, trialling them and adjusting them as a result of a process of ongoing reflection.
Examine	Examine involves explaining how and why an aspect has significance.
Examine comprehensively	Involves evaluating the implementation, the outcome(s), and the ways in which the outcome(s) relate to the planned aims/purpose. Judgements are supported by evidence such as personal accounts, photographs, participant or stakeholder evaluation.
Examine critically	Involves explaining the interrelationship between the role and significance of an aspect by: • identifying assumptions • identifying who is advantaged and disadvantaged • considering pros and cons making judgements and reaching conclusions and providing supporting evidence.
Judgements	Involves forming conclusions that are supported by evidence such as personal accounts, photographs, participant or stakeholder evaluation.
Reflection	To discuss our own thoughts or feelings and findings

Level One Languages

Communicate	This means: • to use a range of language features such as vocabulary, formulaic expressions, and sentence structures successfully • connect information, ideas, and opinions cohesively • achieving communication that is not hindered by inconsistencies
Demonstrate	Show by what you write/say that you understand. <i>Demonstrate how Chihiro realises she is having a dream.</i>
Demonstrate understanding	This involves: • connecting the meaning of relevant aspects of information, ideas, and opinions • communicating understanding that is not significantly hindered by inconsistencies.
Hinder by inconsistencies	Errors in the use of language including pronunciation, intonation, audibility
Interact	Spoken and gestural exchanges that might involve: • asking and responding to questions • reacting to the speaker to show understanding • self-correcting • seeking clarification.

Level Two and Three Languages

Analyse	Tell me what the author did, how they did it and why they did it. <i>Analyse specified aspects of texts (NCEA question)</i>
Clarify	Give a clear outline/state in simpler terms. <i>Clarify the options facing Sylvie as she heads to Paris.</i>
Critical response	Refers to a presentation which includes analysis, interpretation, or evaluation of stimulus material.
Demonstrate understanding	This involves: • connecting and expanding on the meaning of relevant aspects of information, ideas, and opinions • showing understanding of the implied meanings or conclusions within the text.
Effective	Successfully select a range of language that is consistently fit for the context. Skilfully select the language to support communication with almost errors free
Evaluation	To make a judgement about quality or effectiveness, using reasons and evidence.
Infer	Consider given information and speculate (using textual evidence) about consequences. <i>If an earthquake struck, what would Mr. Honda be likely to do?</i>
Interact	Spoken and gestural exchanges that might involve: • a genuine purpose • negotiating meaning • initiating and maintaining • participating and contributing • contextually appropriate language • use of cultural conventions e.g. courtesies, gestures • use of interactive strategies such as fillers, questioning, interrupting, recognising cues, agreeing and disagreeing, thanking, encouraging, apologising, pausing, prompting, seeking clarification.
Interpret	Read/read into information and show your personal understanding of it.
Justify	Give explanations or evidence to support or challenge the ideas and perspectives of others
Perceptively	Show originality and insight in interpretation.
Summarise	Identify the main points or key ideas as well as comparing or contrasting key concepts. <i>Summarise the features of the house Kazuko wants.</i>

Level Two and Three Statistics

Inference	Use evidence from a sample to make a justified conclusion about the population . Explain why the sample is representative, support your conclusion with evidence from the data, and acknowledge that there is always some uncertainty because different samples can give slightly different results.
Justification	Support your findings with clear evidence from the data. Use specific statistics, graphs, or values to explain why your conclusion is reasonable.
Statistical insight	Show deeper thinking by reflecting on your findings. Consider possible reasons for the results, other variables that may have influenced them, limitations of the investigation, or how the results could be applied in context.
Apply	Select and use appropriate statistical methods, demonstrate your understanding of statistical concepts and terminology, and communicate your work clearly using suitable graphs, tables, calculations, and explanations.
Relational thinking (connects ideas)	Show how different statistical ideas connect. Follow a logical sequence of steps, explain your reasoning, interpret results in context, and link your conclusions to the evidence.
Extended abstract thinking (takes ideas further)	Develop and justify a strategy for solving the problem, identify the important statistical ideas, build a clear chain of reasoning, make a well-supported statistical generalisation, and reflect on your conclusion in the context of the investigation.

Technology - Hangarau

Analyse	To separate the topic into its main parts and to discuss the significance of the parts and their inter-relationships. Identify causes. Find evidence to support claims, decisions or generalisations.
Compare	To examine qualities, or characteristics, in order to discover <u>similarities</u> . You should emphasise the similarities, although differences may be mentioned.
Contrast	When you are asked to contrast: dissimilarities, <u>differences</u> , or unlikeness of associated things should be stressed. When compare and contrast are used together you should discuss similarities <u>and</u> differences. i.e. Positives (what works) Negatives (what doesn't) Opportunities (improvements/adaptations)
Describe	This asks you to <u>explain how</u> something works and/or contributes to an overall meaning and/or its impact on decisions. You should recount, characterise, sketch or <u>relate</u> in a narrative (connected) form.
Discuss	To examine opportunities for improvement and/or present considerations for or against a particular decision.
Establish	Convincingly show, prove or demonstrate. Evidence, proof, quotes that support your ideas.
Evaluate	Defend opinions, make judgements about the potential to be fit for purpose or validity of information or decisions made - against the requirements of the brief.
Explain	In explaining an answer, it is best to state the "how" and "why", comment on differences in opinion, and where possible, state causes and reasons. Use sketches, photos or annotations to support your claims.
Explore	<u>Weighing up a range of alternatives</u> . This calls for a complete and detailed answer supported with sketches and/or photos. Looking for ways to adapt or improve.
How	What elements of design, technique or process has been used (<u>Identify</u>)? And In what way has this technique or process been done (<u>Explain</u>)? How it fits or meets requirements or expectations. Because...
Identify	Find, list and/or name (Achieved level question). What you see or know, NOT what you think or feel
Illustrate	<u>Explain</u> or clarify your answer by presenting a figure, picture, diagram or concrete example.
Implement /Apply	Applying acquired knowledge, facts, techniques and rules. Develop, build/ make, plan, select, solve, utilize, model

Justify	To prove or show grounds for your decisions. Evidence should be presented and you should be convincing or persuasive. Use quotations/specific details/ <u>analysis</u> from the research, surveys or consultations you have undertaken which are relevant.
Mock up	A mock up is a physical representation of an idea (part of an intended solution) that is used to test/predict its feasibility.
Model	A model is a physical representation of a technological solution (sometimes scaled) that enables a solution's feasibility to be tested/predicted.
Outline	An outlined answer is a description. You should give main points and essential supplementary materials, omitting minor details, and present the information in systematic arrangement or classification. It should be well organised.
Prototype	Prototyping is the modelling of a realised but yet-to-be-implemented technological outcome. The purpose of prototyping is to evaluate the fitness for purpose of a technological outcome against the brief and is undertaken to establish (or not) a defensible case for its implementation, refinement or further development.
Relate	In a question which asks you to show the relationship or to relate, your answer should describe connections and associations.
Review	A review asks for a critical examination. You should analyse and comment briefly upon the major points of the problem in an organised sequence.
Specify	At key stages in the development (i.e. writing a brief, decision points, evaluations, presenting to stakeholders) you are asked to specify, give, state or present - you are called upon to express the main points in brief, clear, narrative form. (things you can prove or measure- decisions you can track or justify from research, consultations etc)
Stakeholder	A person or groups of people (families, whānau, communities, iwi, organisations, businesses) with a vested interest in a technological outcome, and/or its development. • Key stakeholders are those people that are directly influential or will be directly impacted on by the technological practice itself and/or its resulting outcomes (including the technological outcome and any other by-products). • Wider (community) stakeholders are those people that are less directly influential for or impacted on by the practice or outcome. They can, nonetheless, be identified as having some level of influence, often through others, and/or they may be affected by the project or its outcome in the future.
Summarise	Give in condensed form the <u>main points or facts</u> . All details, illustrations and elaboration are to be omitted.
Survey	Use of open questions that will begin with words like 'how', 'why' and 'explain' and are intended to be more than yes/no questions of factual knowledge. Seeking ANY/ALL useful or relevant information – before prioritising it or drawing conclusions from it.
Synthesize	<u>Informed decision</u> : Combining elements or information together, proposing alternative solutions.
Why	The reason behind. For what effect/purpose/reason. Causes. Why something is true. Why it works.

Level One Visual Arts

Conventions	Refers to the technical, compositional and conceptual aspects of an art work. <i>Use the compositional conventions of linear, perspective and the grid in your painting.</i>
Create a sustained body of related artworks	This involves: • providing clarified ideas in response to an art making proposition • using processes, materials, and techniques with skill. • a sustained body of artworks demonstrates that the student has edited, selected, and ordered a finished related series of artwork to communicate an art making proposition.
Drawing	Drawing refers to the use of media, techniques and processes to arrange elements and principles to develop artwork. <i>Complete an observational drawing in charcoal.</i>
Established practice	Refers to works by artists that are recognised as belonging to a particular style, genre, style convention or way of working. <i>Develop 3 compositions based on stylistic approaches used by Russian constructivists (established practice).</i>
Evaluate Visual Arts processes and conventions	This involves making decisions to inform your own art making such as: • refining the use of a range of processes, materials, and techniques through iteration • selecting and reflecting on experimental work to refine an art making intention.
Identifying	Looking to be able to describe in words and images. <i>Looking at this painting, can you identify the subject matter.</i>
Investigating	Looking closely at artworks or contexts to gather and explore specific visual and cultural details, and record what you find using appropriate visual arts methods.
Practice based visual inquiry	This uses visual arts processes, materials, and techniques such as drawing strategies to explore properties such as shape, texture, mass, and colour, and to record details, alternative views, diagrams, annotations, and selected media.
Produce a significant resolved artwork	This involves: • skilfully managing media and techniques relevant to the art making conventions • effectively communicating an idea or narrative with the appropriate scale, depth, duration, and technical finish.
Responding insightfully	This involves showing thoughtful, well-informed understanding of visual and cultural elements by interpreting their meaning and explaining ideas clearly using specific evidence.

Level Two and Three Visual Arts

Subject	Subject is a thing. <i>The subject in this unit of work is the landscape.</i>
Systematic	Involves critical analysis, evaluation and revisiting of concepts, subject matter, problems or situations from the student's previous work in order to re-form and extend ideas into new work informed by established practice. <i>You can see in this student's folio boards how they have developed sequences of work that link and extend visual ideas in a systematic way.</i>
Theme	Is an idea (not a thing). <i>Explore the theme of anger in your portrait drawing.</i>
Extend	Critically analysing, evaluating and further developing concepts, subject matter, problems or situations in work informed by established practise. <i>Expand your applications of perspective by applying it in a set of drawings to convey the concept of deconstruction.</i>
Regeneration	Take an idea - existing or early - and work it into a new idea. <i>The student has regenerated the initial studies of trees into a sense of...</i>
Synthesis	All elements, conventions, processes work effectively together. <i>This painting is effective because the student has synthesized colour, paint application and composition considerations to convincingly express a stormy sea scape.</i>

Level One Drama

Analyse	Break down and evaluate how meaning is created. Identify drama components → examine their effect → explain how they shape meaning and audience response.
Apply	Use ideas and strategies deliberately to improve the drama. Contribute ideas → try different approaches → choose what works best.
Convey	Communicate a role clearly and purposefully. Understand the character → use techniques deliberately → help the audience understand the role.
Embody	Fully become the character on stage. Create the character → combine techniques effectively → make the character believable and convincing.
Examine	Think deeply about the impact or significance of something. Identify what is happening → consider its effect → reflect on why it matters today.
Explain	Show how and why something works. Identify an example → show the connection → explain how it creates meaning or purpose.
Explore	Find and describe what is happening. Notice what is used → describe it → link it to the purpose of the drama.
Justify	Support your response with reasons and examples. Give your opinion → use evidence from the performance → explain why that evidence supports your view.
Participate	Take an active part in creating drama. Join in → share ideas → use drama elements and conventions in the work.
Perform	Present a role appropriately for an audience. Learn the role → use drama techniques consistently → perform to suit the context.
Refine	Improve and strengthen ideas to make the drama more effective. Develop ideas → adapt and extend them → shape them into a clear, coherent drama.
Respond	Share your thoughts about a performance. Identify a message → describe what you saw → make a personal connection.

Level Two and Three Drama

Apply	This involves selecting and using voice, body, movement and use of space to convey an intention for a scripted context through interpretation of a role, relationships and situation. To do this effectively requires you to create a deliberate impact using drama techniques to enhance the performance in a sustained, truthful, and convincing performance.
Demonstrate perceptive understanding	This involves making insightful connections between the drama components used in the performance, the director's and/or designer's concept, and the wider context.
Devise	This involves an ongoing cycle of: • discussion • improvisation, exploration, experimentation • selection and rejection • shaping • structuring and sequencing • refining.
Devise an effective drama	This involves creating a drama that is convincing, captures the essence of the dramatic context, and has impact and originality.
Discuss	This involves giving insightful explanations of the effect of the use of drama elements, conventions, techniques and technologies, drawing inferences from the performed text, and making connections to your own and/or the wider world.
Effectively use complex performance skills	This involves presenting work that is convincing, capturing the essence of the dramatic context with impact. This is done using complex performance skills to enhance the performance. embodying knowledge of the performance skills of a specific drama or theatre form and the extended use of body, movement, and ensemble interaction for Physical Theatre.
Integrate	This involves blending techniques together in a seamless manner.
Interpret	This involves integrating drama techniques effectively in a performance to support and enhance the interpretation of the scripted text. The performance should draw out layers of meaning and be sustained, truthful, convincing, and has impact.
Perform an acting role effectively	It refers to performing the role with flair and assurance, capturing the essence of the dramatic context with impact.

Level One Music

Use music skills	This involves applying extended music skills consistent with a music style and refers to any combination of aural, technical, theoretical, or physical skills.
Music performance skills	This refers to musical competencies that are used to present music to an audience, including technical proficiency on an instrument, musical shaping, and stagecraft.
Demonstrate skills	This involves: • applying convincing stage presentation skills appropriate to the music performance context • applying fluent technical and musicianship skills in a music performance.
Demonstrate understanding	This involves: • describing music concepts that are significant to selected music • describing contexts that are relevant to the music.
Examine	This involves explaining relationships between music concepts and the contexts using examples from the music.
Evaluate	This involves reaching conclusions about the significance of relationships between music concepts and the contexts of the music.
Shape	This involves applying music concepts to create and organise music ideas in a music style.
Develop	This involves applying music concepts to expand and structure music ideas in a music style.
Refine	This involves applying music concepts to enhance and connect music ideas cohesively in a music style.

Level Two and Three Music

Perform convincingly	This involves the performance being assured, musically expressive and demonstrating interpretive understanding.
Compose convincingly	This involves the musical ideas being developed, structured and represented skilfully, the music demonstrating stylistic assurance and flair, and communicating with impact.
Demonstrate ensemble skills	This involves the individual performer contributing to the cohesion, balance, intonation, feel, style, and accuracy of the group's performance. "Convincingly" involves the individual performer's contribution to the group's performance being sustained and assured.
Convincing instrumentation	This involves the instrumentation showing: • imaginative and idiomatic use of instruments • skilful use of timbres and textural density • clear, accurate, and detailed written scores.
Demonstrate comprehensive aural understanding	This involves listening to music in order to communicate chordal, rhythmic and melodic phrases so that the original music is convincingly reproduced, and to explain the use of elements and features.
Demonstrate comprehensive knowledge of conventions	This involves application of musical elements and features in a range of music scores. A range of music scores refers to music from different cultural, historical and social contexts, e.g. 'art' music, popular, rock, jazz, ethnic, indigenous, folk and stage. (NB: Conventions refer to: • terms, signs and performance markings • rhythm and metre • pitch • tonality and harmony • texture • instruments • form and structure • compositional devices).
Communicate musical intention convincingly	This involves developing, structuring, and representing musical ideas imaginatively. The music demonstrates stylistic assurance and flair and communicates the intention of the composer(s) with impact and conveys the intention of the composer(s) in detail.
Demonstrate comprehensive understanding of harmonic and tonal conventions	In a range of music scores, this involves analysing and convincingly realising extended extracts of harmony within a given framework.
Create effective/convincing arrangements	This involves: • using instrument ranges and playing techniques for expressive effect • applying instrumental combinations and timbres creatively • showing skill in combining and structuring musical ideas • controlling textural density. • skilful, imaginative, and idiomatic writing for specific instruments and/or voices • musical character and imagination.

The Science of Learning

PART ONE Working Memory and Long-Term Memory



Your Two Memory Systems

Working Memory: Your Brain's Notebook

- Working memory is where your brain holds and thinks about information right now.
- It's where you connect what you're learning now to what you already know.
- It can only manage **three to four new ideas at once** before it becomes overloaded.
- When too much information arrives too quickly, your brain starts dropping pieces; this is why lessons or study sessions can suddenly feel confusing.



Long-Term Memory: Your Brain's Library

- Long-term memory has **no known limits** — it stores facts, skills, and concepts for future use.
- Information only makes it into long-term memory when you *think about it in a meaningful way*.
- The more often you use a memory, the stronger the neural pathway becomes.
- Once something is properly stored, it becomes easier to use and recall.



How They Work Together

- Working memory pulls ideas out of long-term memory to help you think, solve problems, and make sense of new information.
- It attaches this new information to existing information stored in your memory.
- Learning happens when information moves from working memory into long term memory and becomes part of your existing knowledge system.

Why This Matters for You

Understanding the limits of working memory and the strengths of long-term memory explains why distractions, multitasking, and cramming often don't work.

You do not have room in the working memory part of your brain.

Working Memory VS Long-term Memory

Working Memory

The working memory has a **small capacity** - this is where we hold and process new information.

If information is not transferred to **long-term memory** here, it will be forgotten.



Long-Term Memory

The long-term memory has a **huge capacity** - this is where we store the things we have learnt.

Connecting information from the working memory to the long-term memory is how one learns new things.



Overwhelmed Working Memory in a Noisy Classroom

At your desk and:

- Your mate is talking gibberish
- The teacher is giving instructions
- Your phone is buzzing
- A complex equation is on the board
- You're thinking about lunch
- You're navigating your laptop
- You're learning Calculus

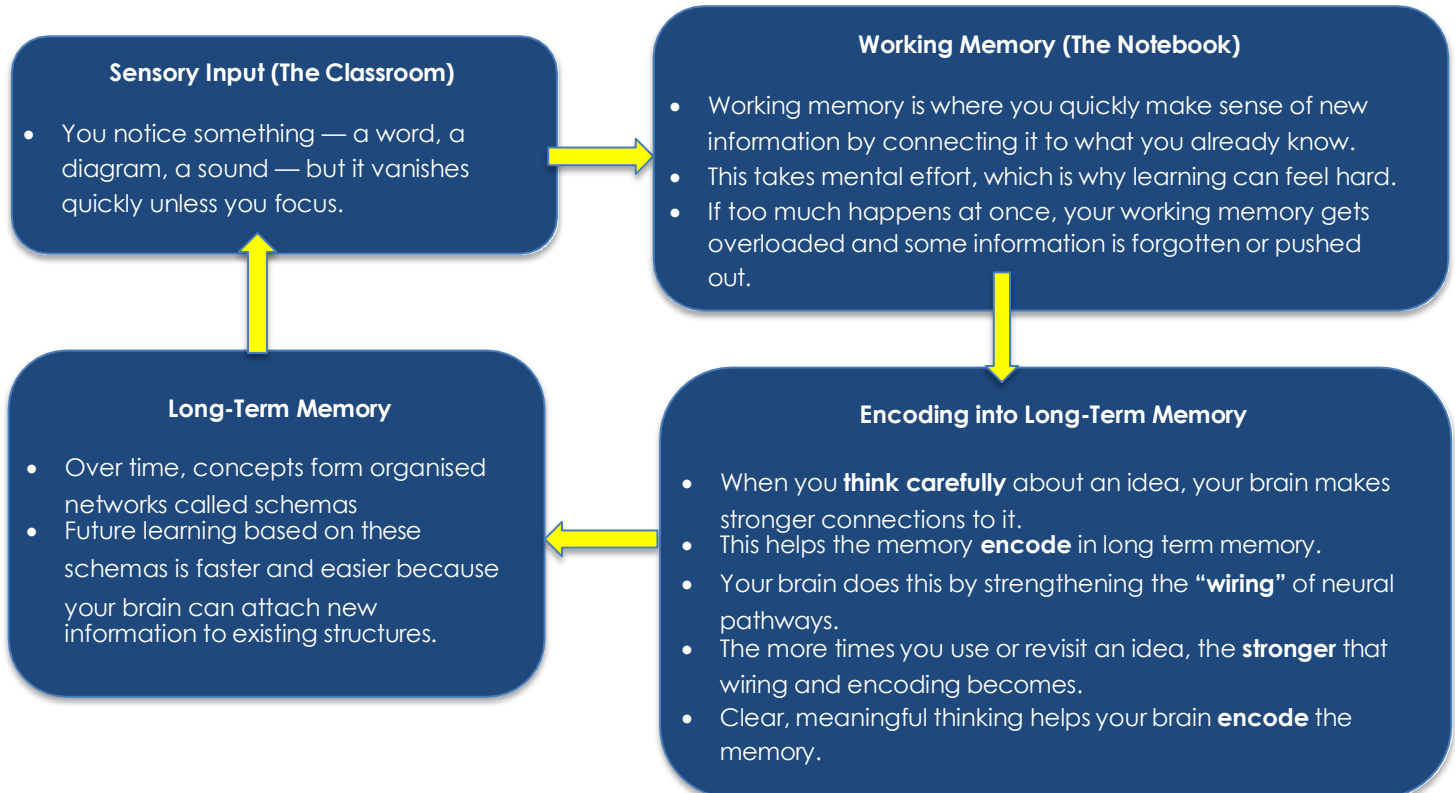
Your Working Memory has no chance!

The Science of Learning

PART TWO How Your Brain Stores Memories — And Why Active Thinking Matters



How Memories Are Stored



Why Active Thinking Beats Passive Study

- Your brain remembers what you think about, not what you simply look at.
 - MEMORIES ARE FRAGMENTS OF THINKING!
 - Copying notes or rereading feels productive, but it uses almost no working-memory processing.
- Active tasks force your brain to THINK and organise information; this strengthens memory pathways.

The Twelve-Word Challenge

- Here are twelve random words:
Oxygen, Democracy, Amazon, Julius Caesar, DNA, Parliament, Volcano, Inflation, Photosynthesis, Election, Andes, Republic
- Spend one minute grouping them into **four categories**, any categories you like.
- After categorising, cover the list and try to **recall all twelve words**.

What you'll notice:

- You remember far more words after sorting them.
- Creating categories forces you to *THINK actively*, building stronger memories or neural pathways.
- This mirrors how long-term memory encoding works: your brain stores thinking, not just reading.

The Key Idea

You don't “download” information. You *build* memory by linking ideas, practising them, and using them over time.

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PART THREE Forgetting and Remembering



Forgetting is not a failure — it's part of how memory works

Decay Theory — Memories Fade if Unused

- Memory traces weaken over time when they aren't activated.
- Working memory especially loses information in seconds unless processed.

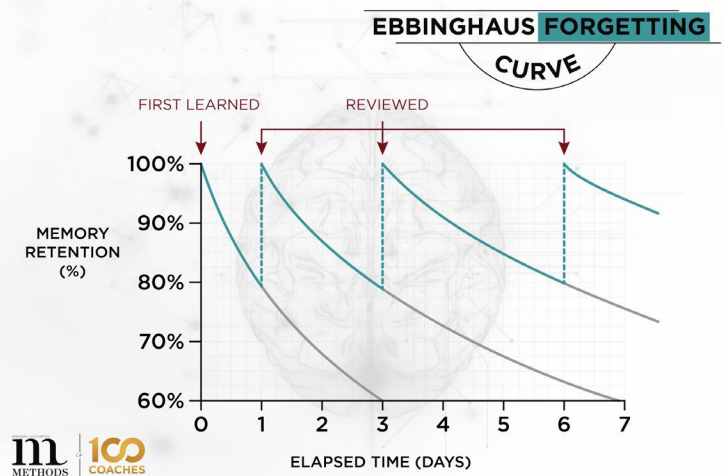
Displacement Theory — New Information Pushes Out Old Information

- Working memory can only hold a few items.
- When new information arrives, older items can be “pushed out” because of limited capacity.

Anterograde Amnesia — A Real-World Example of Encoding Failure

- The brain needs properly functioning systems to encode new long-term memories.
- In anterograde amnesia (including alcohol-related episodes), new memories cannot be stored even though old ones remain intact.

The Ebbinghaus Forgetting Curve



- This explains how your memory fades over time if you do not review what you have learned.
- After you first learn something, you remember almost all of it. But within hours or days, the amount you remember drops quickly.
- The good news is that every time you review the information, you forget less. Your memory becomes **encoded** and lasts longer.
- Think of it like a leaky bucket. If you never top it up, the water drains away. Regular top ups keep it full.

Why This Matters for You- Study Smarter, Not Harder

- If you forget quickly, it may be because the memory never **encoded** fully, not because you're “bad at remembering”.
- Strong **encoding** happens when you engage, think, connect, and revisit ideas.
- 'Forgetting' is simply a signal that the memory pathway needs strengthening.
- **Small habits make a huge difference.**

What This Means for How You Study

Space out your study Do shorter sessions across several days. This is called spaced repetition. Example review schedule: • Right after class • The next day • A few days later • One week later	Use active recall Do activities that make you think and retrieve information from your memory: • Quiz yourself • Explain the idea to someone else • Write down everything you remember • Do practice questions • Categorise items	Avoid last-minute cramming • Cramming fills your brain quickly but it disappears just as quickly. • You might remember it for tomorrow, but not for next month or exams later in the year.	Keep sessions short and regular Your brain learns best with: • 20 to 30 minute study blocks • Breaks in between • Consistent follow-up over time	Make connections • The more you link new ideas to things you already know, the easier they are to remember. • Try drawing mind maps, diagrams • Talk through how different topics connect.
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The Science of Learning

PART FOUR Cognitive Load Theory



Why Learning Feels Hard Sometimes

Remember our Working Memory: Your Brain's Notebook?

- Working memory is where your brain holds and thinks about information right now.
- It's where you connect what you're learning now to what you already know.
- It can usually only manage a few ideas (**three to four**) before becoming overloaded.
- When too much information arrives too quickly, your brain starts dropping pieces; this is why lessons or study can suddenly feel confusing.

What is 'Cognitive Overload'?

- Working memory has limited space.
- Cognitive overload happens when more information arrives than working memory can handle.

What Causes Overload at School?

- Too many instructions at once
- New concepts without enough guidance
- Split attention (diagram here, explanation somewhere else)
- Distractions (noise, devices, multitasking)
- Being asked to figure it out before seeing examples

What Happens When You Are Cognitively Overloaded in Learning?

- Confusion
- Forgetting things quickly
- Feeling stuck or frustrated
- Thinking "I'm bad at this"

The crucial point is that this is a structural brain limit.

IT IS NOT ABOUT ABILITY.

The Three Types of Cognitive Load

Essential Load (The learning itself)

- This comes from the difficulty of the material you are learning.
 - Some learning is meant to be difficult.
 - This load is necessary and unavoidable, and feeling challenged is a normal part of learning.
- Example: Learning a new Maths method or a Science concept for the first time.

Unnecessary Load

- This load does not help learning and competes for space in your working memory and makes learning harder.
 - It comes from how information is presented or from distractions.
- Examples: Too many words on one slide or instructions spread across different places, phone notifications, noise, multitasking, sitting by your mate, who talks...and talks...and talks...

Helpful Load (Thinking that builds understanding and memory)

- This is the effort your brain uses to organise, connect, and make sense of ideas.
 - This type of thinking helps new information move into long-term memory.
- Examples: Grouping or chunking ideas, linking new learning to what you already know, working through examples step by step, etc.

Why This Matters for You

The goal is to **RECOGNISE** and **REDUCE** unnecessary load so your brain has more space for learning that matters

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PART FIVE Creating Your Study Space at Home



How do you reduce cognitive load in your home-based study/homework?

Check Your Current Study Space	Consider Making Some of These Changes
1. Is this space mainly for studying, mostly quiet and interruption free? YES ☐ NO ☐	- Create a space (even within a larger space) that is set up only for study - Avoid family areas or high traffic areas - Create your space so it signals your brain, "this is where we study" and study in the same spot each day - If you must use headphones choose instrumental tracks around 50-80 beats per minute. Lyrics increase load on the language processing area of the brain and interferes with learning - Throw your phone away, forever, or turn on do not disturb, or silence notifications... just get it out of your study space - Declutter your space of extra books, devices, or objects into a drawer, bag, box or another room before you start - Create a clear workspace to organise today's work on - Keep anything irrelevant out of your eyeline or reach - Use two layers of light- soft general room lighting, and a focused desk lamp for close work - Aim for 400–800 lumens from a desk lamp. This is 6–10 watts (LED) or 40–60 watts (incandescent bulbs) - Choose a bulb labelled neutral white or daylight (4000–5000K) - Have a specific goal for any study session written down to make you accountable and to know when you are finished. - E.g. complete five algebra equations and check each answer using substitution - E.g. revise cell respiration by writing a short explanation of each stage and creating a labelled diagram from memory - Create a small study kit with pens, paper, charger, and books - Keep it minimal but your aim is to avoid delaying your start by having to search for what you need - Pack up for two minutes at the end so you can start quickly next session - Remove any clutter from your last study session Desk height should be at about elbow height when seated Chair height. Feet flat on the floor or on a footrest, knees roughly level with or slightly lower than hips, back supported against the chair or a cushion - The top of the screen should be at eye level or slightly below, About arm's length away. Keyboard and mouse positioned so elbows stay close to the body and wrists are straight Books and notebooks Place directly in front, not off to one side and for heavy reading, raising the book slightly reduces neck strain
2. Is my desk or table clear enough to work easily? YES ☐ NO ☐	
3. Is the lighting good enough to work comfortably? YES ☐ NO ☐	
4. Do I know exactly what I am starting with? YES ☐ NO ☐	
5. Are all my study tools in one place? YES ☐ NO ☐	
6. Do I leave the space ready for next time? YES ☐ NO ☐	
7. Am I sitting comfortably and supported? YES ☐ NO ☐	

The Science of Learning

PART SIX Cognitive Load Strategies at Home



Now you have your space, what strategies can reduce cognitive load in your home-based study?

Study Model: The One Chunk Rule

The One Chunk Rule means focusing on one clear idea or skill at a time. Instead of studying a whole topic, choose one specific concept.

Examples:

Mathematics: Instead of saying, "Revise algebra," focus on one chunk such as "How to rearrange basic equations."

Science: Instead of saying, "Revise photosynthesis," focus on one chunk such as:

"Explain the role of chlorophyll in photosynthesis."

English: Instead of saying, "Study our novel" focus on one chunk such as "Memorise five methods of characterisation for the protagonist each with a supporting quote".

From a Cognitive Load Theory point of view, this works because it reduces element interactivity, or the number of new ideas your brain (working memory) must juggle at the same time.

Study Model: The Worked Example

The Worked Example → You Try model reduces working memory load by using a worked example first.

Start by looking at a correct example and reading it slowly, step by step. Pay attention to what is done and why each step is taken. Then cover the example and immediately try a similar task on your own.

Worked examples give your brain a schema, a mental template you can borrow. This frees up working memory so you can focus on the structure of the task and how the steps fit together, instead of figuring out what to do next.

From a Cognitive Load Theory point of view, this works because it removes the need to guess, search, or rely on trial and error. These activities waste working memory without building understanding.

Study Model: Blur → Clear

The Blur → Clear method works by moving information out of your head and onto paper, then organising it into clear chunks.

1. Start with a brain dump. Write down everything you know about the topic, even if it is messy, incomplete, or unsure. This is the blur stage.
2. Highlight the parts that feel confusing, unclear, or shaky.
3. Finally, rewrite the topic as a short, clear summary using simple language and organised ideas.

From a Cognitive Load Theory point of view, this reduces cognitive load by lowering Unnecessary Load caused by mental clutter and helping your brain organise information into manageable chunks. Instead of juggling loose ideas in working memory, your brain can focus on understanding and connections.

Study Model: The Pomodoro Technique

The Pomodoro Technique is a time management technique inspired by a tomato shaped kitchen timer Francesco Cirillo used while studying. The core idea is to break your work into short, focused intervals, known as "pomodoros," followed by brief breaks.

1. Set a Timer: Choose a task you want to work on and set a timer for 25 minutes. This period is known as a pomodoro.
2. Work on the Task: Focus solely on the task until the timer rings.
3. Take a Short Break: Once the timer goes off, take a 5-minute break. Use this time to move, stretch, or something to recharge your mind.
4. Repeat the Cycle: After completing four pomodoros take a longer break of 15 to 30 minutes.

From a Cognitive Load Theory point of view, this is used to enhance your focus, it combats procrastination because you know it is only a short time, it improves your awareness of how long tasks take helping you manage test or exam time, and it also reduces mental fatigue as regular breaks allow your brain to rest and recover, reducing working memory load and improving overall productivity.

USE THIS TECHNIQUE ALONGSIDE THE OTHER THREE

APPENDIX

THESIS STATEMENT

- The generalisation or conclusion framed in one statement that guides the essay.
- A **thesis statement** should appear in the introduction.
- In a literature essay it is the generalised answer to the question. For example, using **The Day of the Triffids**, a thesis statement to the question "Why is the setting important?" might be: 'The setting is important because it challenges man's ability to adapt and enables us to explore how human beings react when their environment rapidly changes'.
- In a research assignment it is the generalised conclusion the student has reached and is about to report on.
- **THE THESIS** is the generalised statement around which the student builds their essay.

PARAGRAPH STRUCTURE – PEER

POINT	What are you writing about? • This sentence introduces the main idea, topic or point of the paragraph. • It should link to and/or develop the <u>thesis</u> of the essay. • It may link to the previous paragraph. • The opening sentence should: 1. integrate the key words of the topic 2. provide some link to the paragraph before 3. clearly indicate what the paragraph will be about.
EXPLANATION	What do you mean? • The next sentence will explain what you meant by your first sentence with more detail. • It may include a judgement or clarify the opinion or direction your argument is going to take. • It may also use key words from the essay topic or <u>thesis</u>. • It should include details that provide a lead into the evidence you are about to offer. This might include: 1. details of a science experiment 2. historical details or background 3. plot details.
EVIDENCE	What makes you say that? • The next sentence will give evidence, proof or examples to support the ideas you have explained. • Evidence might include: 1. statistics, survey results, facts from newspapers or reference sources 2. anecdotes from your own experiences or from the media 3. a quotation from an expert or someone knowledgeable or famous 4. a quotation from the text you have been studying.
RELEVANCE	So why is all that important? • It will probably link back to the first sentence and the <u>thesis</u> of the essay. • This sentence may also serve to analyse and explain the relevance of the evidence you gave. • How does the evidence you gave prove your point?