

Scientific investigation

Students undertake scientific investigations across Units 1 to 4 of this study. Scientific investigations may be undertaken in groups, but all work for assessment must be completed individually. Students maintain a logbook of practical activities in each unit of this study for recording, authentication and assessment purposes.

Students communicate findings for the investigation in Outcome 3, Unit 4 of this study in a scientific poster. The poster may be produced electronically or in hard copy format and should not exceed 1000 words. Students must select information carefully so that they meet the word limit. The production quality of the poster will not form part of the assessment.

The following template is to be used by students in the development of the scientific poster for the investigation undertaken.

Section	Content and activities
Title	Question under investigation is the title
Introduction	Explanation or reason for undertaking the investigation, including a clear aim, a hypothesis and/or prediction and relevant background psychological concepts
Methodology	Summary that outlines the methodology used in the investigation and is authenticated by logbook entries Identification and management of relevant risks, including the relevant health, safety and ethical guidelines followed in the investigation
Results	Presentation of collected data/evidence in appropriate format to illustrate trends, patterns and/or relationships
Discussion	Analysis and evaluation of primary data Identification of outliers and their subsequent treatment Identification of limitations in data and methods, and suggested improvements Linking of results to relevant psychological concepts
Conclusion	Conclusion that provides a response to the question
References and acknowledgments	Referencing and acknowledgment of all quotations and sourced content as they appear in the poster

Unit 1: How are behaviour and mental processes shaped?

Human development involves changes in thoughts, feelings and behaviours. In this unit students investigate the structure and functioning of the human brain and the role it plays in the overall functioning of the human nervous system. Students explore brain plasticity and the influence that brain damage may have on a person's psychological functioning. They consider the complex nature of psychological development, including situations where psychological development may not occur as expected. Students examine the contribution that classical and contemporary studies have made to an understanding of the human brain and its functions, and to the development of different psychological models and theories used to predict and explain the development of thoughts, feelings and behaviours.

A student-directed research investigation related to brain function and/or development is undertaken in this unit. The research investigation draws on content from Area of Study 1 and/or Area of Study 2.

Area of Study 1

How does the brain function?

Advances in brain research methods have led to new ways of understanding the relationship between the mind, brain and behaviour. In this area of study students examine how our understanding of brain structure and function has changed over time and how the brain enables us to interact with the external world around us. They analyse the roles of specific areas of the brain and the interactions between different areas of the brain that enable complex cognitive tasks to be performed. Students explore how brain plasticity and brain damage can affect a person's functioning.

Outcome 1

On completion of this unit the student should be able to describe how understanding of brain structure and function has changed over time, explain how different areas of the brain coordinate different functions, and explain how brain plasticity and brain damage can change psychological functioning.

To achieve this outcome the student will draw on key knowledge outlined in Area of Study 1 and relevant key science skills on [pages 11 and 12](#) of the study design.

Key knowledge

Role of the brain in mental processes and behaviour

- the influence of different approaches over time to understanding the role of the brain, including the brain vs heart debate, mind-body problem, phrenology, first brain experiments and neuroimaging techniques
- the basic structure and function of the central and peripheral nervous systems as communication systems between the body's internal cells and organs and the external world
- the role of the neuron (dendrites, axon, myelin and axon terminals) as the primary functional unit of the nervous system, including the role of glial cells in supporting neuronal function
- the basic structure and function of the hindbrain (cerebellum, medulla), midbrain (reticular formation) and forebrain (hypothalamus, thalamus, cerebrum)
- the role of the cerebral cortex in the processing of complex sensory information, the initiation of voluntary movements, language, symbolic thinking and the regulation of emotion, including localisation of function.

Brain plasticity and brain damage

- infancy and adolescence as periods of rapid development and changes in brain structure and function, including development of myelin, synaptic pruning and frontal lobe development
- the impact of injury to the cerebral cortex on a person's biological, psychological and social functioning and the ability of the brain to undergo adaptive plasticity, illustrated by rehabilitation of people with brain injuries
- the use of animal studies and neuroimaging techniques to develop understanding of human neurological disorders including Parkinson's disease.

Area of Study 2

What influences psychological development?

The psychological development of an individual involves complex interactions between biological, psychological and social factors. In this area of study students explore how these factors influence different aspects of a person's psychological development. They consider the interactive nature of hereditary and environmental factors and investigate specific factors that may lead to development of typical or atypical psychological development in individuals, including a person's emotional, cognitive and social development and the development of psychological disorders.

Outcome 2

On completion of this unit the student should be able to identify the varying influences of nature and nurture on a person's psychological development, and explain different factors that may lead to typical or atypical psychological development.

To achieve this outcome the student will draw on key knowledge outlined in Area of Study 2 and relevant key science skills on [pages 11 and 12](#) of the study design.

Key knowledge**The complexity of psychological development**

- the interactive nature of hereditary and environmental factors on a person's psychological development, illustrated through twin and adoption studies
- the role of critical and sensitive periods in a person's psychological development
- the importance of attachment on an individual's emotional development: genetics; temperament and early life experiences (with reference to the work of Harlow & Ainsworth)
- the development of cognitive abilities from concrete to symbolic thinking (with reference to the work of Piaget)
- psychosocial development across the lifespan as an influence on the development of an individual's personality (with reference to the work of Erikson).

Atypical psychological development

- the conceptualisation of normality including typical and atypical behaviours; adaptive and maladaptive behaviours; and mental health and mental disorder as a continuum
- mental health as a product of internal and external factors which assist individuals to cope with change and challenge
- major categories of psychological disorder: addiction disorders; anxiety disorders; mood disorders; personality disorders; and psychotic disorders
- the 'two-hit' hypothesis as an explanation for the development of particular psychological disorders, illustrated by schizophrenia.

Area of Study 3

Student-directed research investigation

In this area of study students apply and extend their knowledge and skills developed in Areas of Study 1 and/or 2 to investigate a question related to brain function and/or psychological development. Students analyse the scientific evidence that underpins the research in response to a question of interest. They then communicate the findings of their research investigation and explain the psychological concepts, outline contemporary research and present conclusions based on the evidence.

Students may choose a question selected from the list under each topic or they may develop their own research question related to Areas of Study 1 and/or 2 in conjunction with their teacher. For the selected question, students should refer to at least two contemporary psychological studies and/or research techniques.

Topic 1: Biopsychology

- Are the sexes psychologically, as well as biologically, different?
- How do drugs such as caffeine and alcohol affect brain function?
- How do brain structures in animals compare with those in humans?
- What are the roles of the left and right hemisphere?
- Is the brain just a complex electric circuit?
- How are nerve cells such as grid cells specialised for different functions?
- How can brain trauma in sporting injuries affect cognitive function?
- Are animal studies of brain function directly translatable to human brain function?
- Do people use all of their brain capacity?
- How is psychological development affected by factors such as the prenatal environment?
- How 'plastic' is the human brain?
- Which areas of the brain are involved in specific psychological disorders?

Topic 2: Brain and the use of technology

- Are 'brain training programs' effective?
- How does the use of technology impact on brain functioning?
- Is our use of the internet changing the way we think and behave?
- How has neuroimaging changed our understanding of brain structure and function?
- How can technology be used to help people recover from brain trauma or injury?
- How are different neuroimaging techniques used to study brain structure and function?
- Does playing violent video games affect the structure and functioning of the adolescent brain?
- Is it possible to create artificial intelligence?
- What are the psychological justifications for it to be illegal to drive and use a mobile phone at the same time?
- How can transcranial magnetic stimulation be used as a mental health treatment?

Topic 3: Cognition

- What happens in the brain when we feel different emotions?
- How does brain development influence decision making in adolescents?
- How does play-based learning support children's cognitive development?
- Why are humans able to create art and invent things?
- How does the brain enable decision making and problem solving?
- Does extra-sensory perception exist?

- What is 'intelligence'?
- Is there a link between high IQ and high levels of symbolic thinking?
- Are some languages easier to learn than others?
- How does Freud explain the 'preconscious', 'conscious' and 'unconscious' mind?

Topic 4: Psychological development

- How does learning to play a musical instrument affect psychological development?
- Do different parenting styles affect the psychological development of children and adolescents?
- What are the developmental reasons for film/video game classification systems?
- What role does attachment play in the development of an individual's personality?
- How does attachment theory inform parental decisions about child-care arrangements?
- How does Piaget's theory influence the development/selection of age appropriate toys?
- Can personality be determined by the Rorschach test?
- Does the 'two-hit' hypothesis apply to all mental disorders?
- Are longitudinal studies useful when studying psychological development?
- What are the main criticisms of Piaget's theory of cognitive development?
- How accepted are Freud's theories related to the development of the id, ego and superego during infancy and childhood?

Topic 5: Mental health and disorder

- What are some of the strengths and limitations in using classification systems to diagnose atypical behaviours and mental disorders?
- How is the nature/nurture debate related to a consideration of mental health and mental disorder?
- How can temporary emotional states such as grief affect classification of behaviour and mental states?
- Why have some mental disorders been reclassified over time as not being disorders while other health conditions become newly classified as mental disorders?
- How has the treatment of mental disorders changed over time?
- When does a fear become a phobia?
- To what extent is mental disorder a cultural construct?
- Why is a fear of public speaking difficult to classify?
- Why isn't caffeine addiction identified as a mental disorder?

Topic 6: Changing thoughts, feelings and behaviour

- What is the current research on and evidence for possible biological or psychological factors being involved in the development of syndromes such as Tourette syndrome?
- How can creativity and imagination be encouraged and fostered?
- How do inspiration and motivation affect thoughts, feelings and behaviour?
- What strategies can people use to change maladaptive behaviours?
- Do moods bias judgment?
- Are emotions contagious?
- How is the brain involved in 'self-actualisation'?
- How does foetal alcohol syndrome affect nervous system functioning?
- What is the psychological basis for common types of intervention programs used to support young people?
- What are the potential risks of substance use (such as alcohol and illicit drugs) on adolescent psychological functioning?
- How did Freud explain the use of defense mechanisms when dealing with conflicts or problems in life?

Outcome 3

On completion of this unit the student should be able to investigate and communicate a substantiated response to a question related to brain function and/or development, including reference to at least two contemporary psychological studies and/or research techniques.

To achieve this outcome the student will draw on key knowledge outlined in Area of Study 3 and relevant key science skills on [pages 11 and 12](#) of the study design.

Key knowledge

- the characteristics of effective science communication: accuracy of psychological information; clarity of explanation of psychological concepts, ideas and models; contextual clarity in terms of importance and implications of findings; conciseness and coherence; and appropriateness for purpose and audience
- the psychological concepts specific to the investigation: definitions of key terms; use of appropriate psychological terminology, conventions and representations
- the use of data representations, models and theories in organising and explaining observed phenomena and psychological concepts, and their limitations
- the nature of evidence and information: distinction between opinion, anecdote and evidence, weak and strong evidence, and scientific and non-scientific ideas; validity and reliability of data including sources of possible errors or bias
- the influence of social, economic, cultural and ethical factors relevant to the selected psychological investigation.

Assessment

The award of satisfactory completion for a unit is based on whether the student has demonstrated the set of outcomes specified for the unit. Teachers should use a variety of learning activities and assessment tasks that provide a range of opportunities for students to demonstrate key knowledge and key skills in the outcomes.

The areas of study, including the key knowledge and key skills listed for the outcomes, should be used for course design and the development of learning activities and assessment tasks. Assessment must be a part of the regular teaching and learning program and should be completed mainly in class and within a limited timeframe.

All assessment at Units 1 and 2 are school-based. Procedures for assessment of levels of achievement in Units 1 and 2 are a matter for school decision.

For this unit students are required to demonstrate achievement of three outcomes. As a set these outcomes encompass all areas of study in the unit.

Suitable tasks for assessment may be selected from the following:

For Outcomes 1 and 2

- a report of a practical activity involving the collection of primary data
- a research investigation involving the collection of secondary data
- a brain structure modelling activity
- a logbook of practical activities
- analysis of data/results including generalisations/conclusions
- media analysis/response
- problem solving involving psychological concepts, skills and/or issues
- a test comprising multiple choice and/or short answer and/or extended response
- a reflective learning journal/blog related to selected activities or in response to an issue

For Outcome 3

- a report of an investigation into brain function and/or development that can be presented in various formats, for example digital presentation, oral presentation, or written report.

Where teachers allow students to choose between tasks they must ensure that the tasks they set are of comparable scope and demand.

Practical work is a central component of learning and assessment. As a guide, between 3½ and 5 hours of class time should be devoted to student practical work and investigations for each of Areas of Study 1 and 2. For Area of Study 3, between 6 and 8 hours of class time should be devoted to undertaking the investigation and communicating findings.

Unit 2: How do external factors influence behaviour and mental processes?

A person's thoughts, feelings and behaviours are influenced by a variety of biological, psychological and social factors. In this unit students investigate how perception of stimuli enables a person to interact with the world around them and how their perception of stimuli can be distorted. They evaluate the role social cognition plays in a person's attitudes, perception of themselves and relationships with others. Students explore a variety of factors and contexts that can influence the behaviour of an individual and groups. They examine the contribution that classical and contemporary research has made to the understanding of human perception and why individuals and groups behave in specific ways.

A student practical investigation related to internal and external influences on behaviour is undertaken in this unit. The investigation draws on content from Area of Study 1 and/or Area of Study 2.

Area of Study 1

What influences a person's perception of the world?

Human perception of internal and external stimuli is influenced by a variety of biological, psychological and social factors. In this area of study students explore two aspects of human perception – vision and taste – and analyse the relationship between sensation and perception of stimuli. They consider how biological, psychological and social factors can influence a person's perception of visual and taste stimuli, and explore circumstances where perceptual distortions of vision and taste may occur.

Outcome 1

On completion of this unit the student should be able to compare the sensations and perceptions of vision and taste, and analyse factors that may lead to the occurrence of perceptual distortions.

To achieve this outcome the student will draw on key knowledge outlined in Area of Study 1 and relevant key science skills on [pages 11 and 12](#) of the study design.

Key knowledge

Sensation and perception

- sensation and perception as two complementary but distinct roles in the reception, processing and interpretation of sensory information
- taste and vision as two examples of human sensory systems, including the roles of sensory receptors and receptive fields, transmission of sensory information to the brain, and representation of sensory information in the cerebral cortex
- the influence of biological, psychological and social factors on visual perception, including depth cues, visual perception principles and perceptual set
- the influence of biological, psychological and social factors on gustatory perception, including age, genetics, perceptual set (including food packaging and appearance) and culture.

Distortions of perception

- the fallibility of visual and gustatory perception systems, demonstrated by visual illusions and the judgment of flavours (influence of perceptual set, colour intensity and texture)
- distortions of perception of taste and vision in healthy, intact brains as providing insight into brain function related to perception, illustrated by synaesthesia.

Area of Study 2

How are people influenced to behave in particular ways?

A person's social cognition and behaviour influence the way they view themselves and the way they relate to others. In this area of study students explore the interplay of biological, psychological and social factors that shape the behaviour of individuals and groups. They consider how these factors can be used to explain the cause and dynamics of particular individual and group behaviours, including attitude formation, prejudice, discrimination, helping behaviour and bullying. Students examine the findings of classical and contemporary research as a way of theorising and explaining individual and group behaviour.

Outcome 2

On completion of this unit the student should be able to identify factors that influence individuals to behave in specific ways, and analyse ways in which others can influence individuals to behave differently.

To achieve this outcome the student will draw on key knowledge outlined in Area of Study 2 and relevant key science skills on [pages 11 and 12](#) of the study design.

Key knowledge**Social cognition**

- the role of person perception, attributions, attitudes and stereotypes in interpreting, analysing, remembering and using information about the social world
- the applications and limitations of the tri-component model of attitudes
- attitudes and stereotypes that may lead to prejudice and discrimination.

Social influences on behaviour

- the influence of status and social power within groups, and obedience and conformity on individual behaviour, with reference to theorists including Asch, Milgram and Zimbardo
- the influences on helping behaviour (or reluctance to help) including personal, situational and social factors
- factors that influence bullying (including cyberbullying) behaviour and the effects of bullying behaviour on an individual's psychological functioning
- positive and negative influences of media on individual and group behaviour, illustrated by advertising, television, video games and social media.

Area of Study 3

Student-directed practical investigation

In this area of study students design and conduct a practical investigation related to external influences on behaviour.

The investigation requires the student to develop a question, plan a course of action to answer the question, undertake an investigation to collect the appropriate primary qualitative and/or quantitative data, organise and interpret the data and reach a conclusion in response to the question. The investigation relates to knowledge and skills developed in Areas of Study 1 and/or 2 and is undertaken by the student using either quantitative or qualitative methods, including experiments, surveys, questionnaires, observational studies and/or rating scales.

Outcome 3

On completion of this unit the student should be able to design and undertake a practical investigation related to external influences on behaviour, and draw conclusions based on evidence from collected data.

To achieve this outcome the student will draw on key knowledge outlined in Area of Study 3 and relevant key science skills on [pages 11 and 12](#) of the study design.

Key knowledge

- development of an investigable question and formulation of a research hypothesis
- the psychological concepts specific to the investigation and their significance, including definitions of key terms, and psychological representations
- the characteristics of scientific research methodologies, including techniques for primary qualitative and quantitative data collection relevant to the investigation: experiments, surveys, questionnaires, observational studies and/or use of rating scales; reliability and validity of data; and minimisation of experimental bias
- ethics and issues of research including identification and application of relevant health, safety and bioethical guidelines, and use of human subjects
- methods of organising, analysing and evaluating primary data to identify patterns and relationships including sources of error and limitations of data and methodologies
- observations and experiments that are consistent with, or challenge, current psychological models, theories or frameworks
- the nature of evidence that supports or refutes a hypothesis, model or theory
- the key findings of the selected investigation and their relationship to psychological concepts and theories associated with perception and/or social cognition and influences
- the conventions of scientific report writing including psychological terminology and representations and standard abbreviations.

Assessment

The award of satisfactory completion for a unit is based on whether the student has demonstrated the set of outcomes specified for the unit. Teachers should use a variety of learning activities and assessment tasks that provide a range of opportunities for students to demonstrate key knowledge and key skills in the outcomes.

The areas of study, including the key knowledge and key skills listed for the outcomes, should be used for course design and the development of learning activities and assessment tasks. Assessment must be a part of the regular teaching and learning program and should be completed mainly in class and within a limited timeframe.

All assessment at Units 1 and 2 are school-based. Procedures for assessment of levels of achievement in Units 1 and 2 are a matter for school decision.

For this unit students are required to demonstrate achievement of three outcomes. As a set these outcomes encompass all areas of study.

Suitable tasks for assessment for these outcomes may be selected from the following:

For Outcomes 1 and 2

- a report of a practical activity involving the collection of primary data
- a research investigation involving the collection of secondary data
- a logbook of practical activities
- analysis of data/results including generalisations/conclusions
- media analysis/response
- problem solving involving psychological concepts, skills and/or issues
- a test comprising multiple choice and/or short answer and/or extended response
- a reflective learning journal/blog related to selected activities or in response to an issue

For Outcome 3

- a report of an investigation into internal and/or external influences on behaviour that can be presented in various formats, for example digital presentation, oral presentation, scientific poster or written report.

Where teachers allow students to choose between tasks they must ensure that the tasks they set are of comparable scope and demand.

Practical work is a central component of learning and assessment. As a guide, between 3½ and 5 hours of class time should be devoted to student practical work and investigations for each of Areas of Study 1 and 2. For Area of Study 3, between 6 and 8 hours of class time should be devoted to undertaking the investigation and communicating findings.

Unit 3: How does experience affect behaviour and mental processes?

The nervous system influences behaviour and the way people experience the world. In this unit students examine both macro-level and micro-level functioning of the nervous system to explain how the human nervous system enables a person to interact with the world around them. They explore how stress may affect a person's psychological functioning and consider the causes and management of stress. Students investigate how mechanisms of memory and learning lead to the acquisition of knowledge, the development of new capacities and changed behaviours. They consider the limitations and fallibility of memory and how memory can be improved. Students examine the contribution that classical and contemporary research has made to the understanding of the structure and function of the nervous system, and to the understanding of biological, psychological and social factors that influence learning and memory.

A student practical investigation related to mental processes and psychological functioning is undertaken in either Unit 3 or Unit 4, or across both Units 3 and 4, and is assessed in Unit 4, Outcome 3. The findings of the investigation are presented in a scientific poster format as outlined in the template on [page 13](#).

Area of Study 1

How does the nervous system enable psychological functioning?

In this area of study, students explore the role of different branches of the nervous system in enabling a person to integrate, coordinate and respond to internal and external sensory stimuli. They explore the specialised structures and functioning of neurons that allow the nervous system to transmit neural information. Students evaluate how biological, psychological and social factors can influence a person's nervous system functioning. In particular, they consider the ways in which stress can affect the mind and body, the role that the nervous system plays in these processes and how stress can be managed.

Outcome 1

On completion of this unit the student should be able to explain how the structure and function of the human nervous system enables a person to interact with the external world and analyse the different ways in which stress can affect nervous system functioning.

To achieve this outcome the student will draw on key knowledge outlined in Area of Study 1 and relevant key science skills on [pages 11 and 12](#) of the study design.

Key knowledge

Nervous system functioning

- the roles of different divisions of the nervous system (central and peripheral nervous systems and their associated sub-divisions) in responding to, and integrating and coordinating with, sensory stimuli received by the body
- the distinction between conscious and unconscious responses by the nervous system to sensory stimuli, including the role of the spinal reflex
- the role of the neuron (dendrites, axon, myelin and axon terminals) as the primary cell involved in the reception and transmission of information across the synapse (excluding details related to signal transduction)
- the role of neurotransmitters in the transmission of neural information between neurons (lock-and-key process) to produce excitatory effects (as with glutamate) or inhibitory effects (as with gamma-amino butyric acid [GABA])
- the effects of chronic changes to the functioning of the nervous system due to interference to neurotransmitter function, as illustrated by the role of dopamine in Parkinson's disease.

Stress as an example of a psychobiological process

- sources of stress (eustress and distress) including daily pressures, life events, acculturative stress, major stress and catastrophes that disrupt whole communities
- models of stress as a biological process, with reference to Selye's General Adaptation Syndrome of alarm reaction (shock/counter shock), resistance and exhaustion, including the 'fight-flight-freeze' response and the role of cortisol
- models of stress as a psychological process, with reference to Richard Lazarus and Susan Folkman's Transactional Model of Stress and Coping (stages of primary and secondary appraisal)
- context-specific effectiveness, coping flexibility and use of particular strategies (exercise and approach and avoidance strategies) for coping with stress.

Area of Study 2

How do people learn and remember?

Memory and learning are core components of human identity: they connect past experiences to the present and shape futures by enabling adaptation to daily changes in the environment. In this area of study students study the neural basis of memory and learning and examine factors that influence the learning of new behaviours and the storage and retention of information in memory. They consider the influence of biological, psychological and social factors on the fallibility of memory.

Outcome 2

On completion of this unit the student should be able to apply biological and psychological explanations for how new information can be learnt and stored in memory, and provide biological, psychological and social explanations of a person's inability to remember information.

To achieve this outcome the student will draw on key knowledge outlined in Area of Study 2 and relevant key science skills on [pages 11 and 12](#) of the study design.

Key knowledge

Neural basis of learning and memory

- neural plasticity and changes to connections between neurons (including long-term potentiation and long-term depression) as the fundamental mechanisms of memory formation that leads to learning
- the role of neurotransmitters and neurohormones in the neural basis of memory and learning (including the role of glutamate in synaptic plasticity and the role of adrenaline in the consolidation of emotionally arousing experiences).

Models to explain learning

- classical conditioning as a three-phase process (before conditioning, during conditioning and after conditioning) that results in the involuntary association between a neutral stimulus and unconditioned stimulus to produce a conditioned response, including stimulus generalisation, stimulus discrimination, extinction and spontaneous recovery
- operant conditioning as a three-phase model (antecedent, behaviour, consequence) involving reinforcers (positive and negative) and punishment (including response cost) that can be used to change voluntary behaviours, including stimulus generalisation, stimulus discrimination and spontaneous recovery (excluding schedules of reinforcement)
- observational learning as a method of social learning, particularly in children, involving attention, retention, reproduction, motivation and reinforcement
- the 'Little Albert' experiment as illustrating how classical conditioning can be used to condition an emotional response, including ethical implications of the experiment.

Process of memory

- the multi-store model of memory (Atkinson-Shiffrin) with reference to the function, capacity and duration of sensory, short-term and long-term memory
- interactions between specific regions of the brain (cerebral cortex, hippocampus, amygdala and cerebellum) in the storage of long-term memories, including implicit and explicit memories.

Reliability of memory

- methods to retrieve information from memory or demonstrate the existence of information in memory, including recall, recognition, relearning and reconstruction
- the effects of brain trauma on areas of the brain associated with memory and neurodegenerative diseases, including brain surgery, anterograde amnesia and Alzheimer's disease
- the factors influencing a person's ability and inability to remember information, including context and state dependent cues, maintenance and elaborative rehearsal and serial position effect
- the reconstruction of memories as evidence for the fallibility of memory, with reference to Loftus' research into the effect of leading questions on eye-witness testimonies.

School-based assessment

Satisfactory completion

The award of satisfactory completion for a unit is based on whether the student has demonstrated the set of outcomes specified for the unit. Teachers should use a variety of assessment tasks to provide a range of opportunities for students to demonstrate the key knowledge and key skills in the outcomes.

The areas of study and key knowledge and key skills listed for the outcomes should be used for course design and the development of learning activities and assessment tasks.

Assessment of levels of achievement

The student's level of achievement in Unit 3 will be determined by School-assessed Coursework. School-assessed Coursework tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe.

Where teachers provide a range of options for the same School-assessed Coursework task, they should ensure that the options are of comparable scope and demand.

The types and range of forms of School-assessed Coursework for the outcomes are prescribed within the study design. The VCAA publishes *Advice for teachers* for this study, which includes advice on the design of assessment tasks and the assessment of student work for a level of achievement

Teachers will provide to the VCAA a numerical score representing an assessment of the student's level of achievement. The score must be based on the teacher's assessment of the performance of each student on the tasks set out in the following table.

Contribution to final assessment

School-assessed Coursework for Unit 3 will contribute 16 per cent to the study score.

Outcomes	Marks allocated*	Assessment tasks
<p>Outcome 1</p> <p>Explain how the structure and function of the human nervous system enables a person to interact with the external world and analyse the different ways in which stress can affect nervous system functioning.</p>	50	<p>At least one task selected from:</p> <ul style="list-style-type: none"> • annotations of at least two practical activities from a practical logbook • evaluation of research • a report of a student investigation • an analysis of data including generalisations and conclusions • a visual presentation • media analysis/response • a response to a set of structured questions • a reflective blog/learning journal related to selected activities or in response to an issue • a test <p>(approximately 50 minutes or not exceeding 1000 words for each task)</p>
<p>Outcome 2</p> <p>Apply biological and psychological explanations for how new information can be learnt and stored in memory, and provide biological, psychological and social explanations of a person's inability to remember information.</p>	50	<p>At least one task (which is different from the type of task/s for Outcome 1) selected from:</p> <ul style="list-style-type: none"> • annotations of at least two practical activities from a practical logbook • evaluation of research • a report of a student investigation • analysis of data including generalisations and conclusions • a flow chart • media analysis/response • a response to a set of structured questions • a reflective blog/learning journal related to selected activities or in response to an issue • a test <p>(approximately 50 minutes or not exceeding 1000 words for each task)</p>
Total marks	100	

*School-assessed Coursework for Unit 3 contributes 16 per cent.

Practical work and assessment

Practical work is a central component of learning and assessment. As a guide, between 3½ and 5 hours of class time should be devoted to student practical work and investigations for each of Areas of Study 1 and 2.

External assessment

The level of achievement for Units 3 and 4 is also assessed by an end-of-year examination, which will contribute 60 per cent to the study score.

Unit 4: How is wellbeing developed and maintained?

Consciousness and mental health are two of many psychological constructs that can be explored by studying the relationship between the mind, brain and behaviour. In this unit students examine the nature of consciousness and how changes in levels of consciousness can affect mental processes and behaviour. They consider the role of sleep and the impact that sleep disturbances may have on a person's functioning. Students explore the concept of a mental health continuum and apply a biopsychosocial approach, as a scientific model, to analyse mental health and disorder. They use specific phobia to illustrate how the development and management of a mental disorder can be considered as an interaction between biological, psychological and social factors. Students examine the contribution that classical and contemporary research has made to the understanding of consciousness, including sleep, and the development of an individual's mental functioning and wellbeing.

A student practical investigation related to mental processes and psychological functioning is undertaken in either Unit 3 or Unit 4, or across both Units 3 and 4, and is assessed in Unit 4, Outcome 3. The findings of the investigation are presented in a scientific poster format as outlined in the template on [page 13](#).

Area of Study 1

How do levels of consciousness affect mental processes and behaviour?

Differences in levels of awareness of sensations, thoughts and surroundings influence individuals' interactions with their environment and with other people. In this area of study students focus on states of consciousness and the relationship between consciousness and thoughts, feelings and behaviours. They explore the different ways in which consciousness can be studied from physiological and psychological perspectives and how states of consciousness can be altered. Students consider the nature and importance of sleep and apply biological, psychological and social factors to analyse the effects of sleep disturbances on psychological functioning, including mood, cognition and behaviour.

Outcome 1

On completion of this unit the student should be able to explain consciousness as a continuum, compare theories about the purpose and nature of sleep, and elaborate on the effects of sleep disruption on a person's functioning.

To achieve this outcome the student will draw on key knowledge outlined in Area of Study 1 and relevant key science skills on [pages 11 and 12](#) of the study design.

Key knowledge

Nature of consciousness

- consciousness as a psychological construct that varies along a continuum, broadly categorised into normal waking consciousness and altered states of consciousness (naturally occurring and induced)
- the measurement of physiological responses to indicate different states of consciousness, including electroencephalograph (EEG), electromyograph (EMG), electro-oculograph (EOG) and other techniques to investigate consciousness (measurement of speed and accuracy on cognitive tasks, subjective reporting of consciousness, including sleep diaries, and video monitoring)
- changes in a person's psychological state due to levels of awareness, controlled and automatic processes, content limitations, perceptual and cognitive distortions, emotional awareness, self-control and time orientation

- changes in levels of alertness as indicated by brain waves patterns (beta, alpha, theta, delta) due to drug-induced altered states of consciousness (stimulants and depressants)
- the effects on consciousness (cognition, concentration and mood) of one night of full sleep deprivation as a comparison with effects of legal blood-alcohol concentrations.

Importance of sleep

- sleep as a regular and naturally occurring altered state of consciousness that follows a circadian rhythm and involves the ultradian rhythms of REM and NREM Stages 1–4 sleep excluding corresponding brain wave patterns and physiological responses for each stage
- theories of the purpose and function of sleep (REM and NREM) including restoration theory and evolutionary (circadian) theory
- the differences in sleep across the lifespan and how these can be explained with reference to the total amount of sleep and changes in a typical pattern of sleep (proportion of REM and NREM) .

Effects of sleep disturbances and possible treatments

- changes to a person's sleep-wake cycle and susceptibility to experiencing a circadian phase disorder, including sleep-wake shifts in adolescence, shift work and jet lag
- the effects of partial sleep deprivation (inadequate sleep either in quantity or quality) on a person's affective (amplified emotional responses), behavioural and cognitive functioning
- the distinction between dyssomnias (including sleep-onset insomnia) and parasomnias (including sleep walking) with reference to the effects on a person's sleep-wake cycle
- the interventions to treat sleep disorders including cognitive behavioural therapy (with reference to insomnia) and bright light therapy (with reference to circadian phase disorders).

Area of Study 2

What influences mental wellbeing?

In this area of study, students examine what it means to be mentally healthy. They explore the concept of a mental health continuum and factors that explain how location on the continuum for an individual may vary over time. Students apply a biopsychosocial approach to analyse mental health and mental disorder, and evaluate the roles of predisposing, precipitating, perpetuating and protective factors in contributing to a person's mental state. Specific phobia is used to illustrate how a biopsychosocial approach can be used to explain how biological, psychological and social factors are involved in the development and management of a mental disorder. Students explore the concepts of resilience and coping and investigate the psychological basis of strategies that contribute to mental wellbeing.

Outcome 2

On completion of this unit the student should be able to explain the concepts of mental health and mental illness including influences of risk and protective factors, apply a biopsychosocial approach to explain the development and management of specific phobia, and explain the psychological basis of strategies that contribute to mental wellbeing.

To achieve this outcome the student will draw on key knowledge outlined in Area of Study 2 and relevant key science skills on [pages 11 and 12](#) of the study design.

Key knowledge**Defining mental health**

- mental health as a continuum (mentally healthy, mental health problems, mental disorders) influenced by internal and external factors that can fluctuate over time
- the typical characteristics of a mentally healthy person, including high levels of functioning, social and emotional well-being and resilience to life stressors
- ethical implications in the study of, and research into, mental health, including informed consent and use of placebo treatments.

Factors that contribute to the development and progression of mental health disorders

- the distinction between predisposing risk factors (increase susceptibility), precipitating risk factors (increase susceptibility and contribute to occurrence), perpetuating risk factors (inhibit recovery) and protective factors (prevent occurrence or re-occurrence)
- the influence of biological risk factors including genetic vulnerability to specific disorders, poor response to medication due to genetic factors, poor sleep and substance use
- the influence of psychological risk factors including rumination, impaired reasoning and memory, stress and poor self-efficacy
- the influence of social risk factors including disorganised attachment, loss of a significant relationship and the role of stigma as a barrier to accessing treatment
- the concept of cumulative risk.

Application of a biopsychosocial approach, as a scientific model, to explain specific phobia

- the distinctions between stress, phobia and anxiety; variation for individuals with stress, phobia and anxiety on a mental health continuum
- the relative influences of contributing factors to the development of specific phobia with reference to: gamma-amino butyric acid (GABA) dysfunction, the role of stress response and long-term potentiation (biological); behavioural models involving precipitation by classical conditioning and perpetuation by operant conditioning, cognitive bias including memory bias and catastrophic thinking (psychological); specific environmental triggers and stigma around seeking treatment (social)
- evidence-based interventions and their use for specific phobia with reference to: the use of short-acting anti-anxiety benzodiazepine agents (gamma-amino butyric acid [GABA] agonists) in the management of phobic anxiety and relaxation techniques including breathing retraining and exercise (biological); the use of cognitive behavioural therapy (CBT) and systematic desensitisation as psychotherapeutic treatments of phobia (psychological); psychoeducation for families/supporters with reference to challenging unrealistic or anxious thoughts and not encouraging avoidance behaviours (social).

Maintenance of mental health

- resilience as a positive adaption to adversity including the relative influence of protective factors with reference to: adequate diet and sleep (biological); cognitive behavioural strategies (psychological); support from family, friends and community (social)
- models of behaviour change with reference to the transtheoretical model including the stages of pre-contemplation, contemplation, preparation, action and maintenance/relapse.

Area of Study 3

Practical investigation

The investigation requires the student to identify an aim, develop a question, formulate a research hypothesis including operationalised variables and plan a course of action to answer the question and that takes into account safety and ethical guidelines. Students then undertake an experiment that involves the collection of primary qualitative and/or quantitative data, analyse and evaluate the data, identify limitations of data and methods, link experimental results to science ideas, reach a conclusion in response to the question and suggest further investigations which may be undertaken. Results are communicated in a scientific poster format according to the template on [page 13](#). A practical work folio must be maintained by the student for record, authentication and assessment purposes.

A student-designed or adapted practical investigation related to mental processes and psychological functioning is undertaken in either Unit 3 or Unit 4, or across both Units 3 and 4. The investigation relates to knowledge and skills developed across Units 3 and 4, and is undertaken by the student using an appropriate experimental research design involving independent groups, matched participants, repeated measures or a cross-sectional study.

Outcome 3

On completion of this unit the student should be able to design and undertake a practical investigation related to mental processes and psychological functioning, and present methodologies, findings and conclusions in a scientific poster.

To achieve this outcome the student will draw on key knowledge outlined in Area of Study 3 and the related key science skills on [pages 11 and 12](#) of the study design.

Key knowledge

- independent and dependent variables and operationalisation of variables
- the psychological concepts specific to the investigation and their significance, including definitions of key terms, and psychological representations
- the characteristics of scientific research methodologies and techniques of primary qualitative and quantitative data collection relevant to the selected investigation: experiments, self-reports, questionnaires, interviews and/or use of rating scales; reliability and validity of data; and minimisation of experimental bias and confounding and extraneous variables
- ethics and issues of research including identification and application of relevant ethical, health and safety guidelines, and use of human subjects
- methods of organising, analysing and evaluating primary data to identify patterns and relationships including sources of error and limitations of data and methodologies
- models and theories, and their use in organising and understanding observed phenomena and psychological concepts including their limitations
- the nature of evidence that supports or refutes a hypothesis, model or theory
- generalisability of statistics from samples to the populations from which the sample was derived
- the key findings of the selected investigation and their relationship to psychological concepts and theories associated with neural function, consciousness, learning, memory and/or mental wellbeing
- conventions of psychological report writing and scientific poster presentation including psychological terminology and representations, standard abbreviations and acknowledgment of references.

School-based assessment

Satisfactory completion

The award of satisfactory completion for a unit is based on whether the student has demonstrated the set of outcomes specified for the unit. Teachers should use a variety of assessment tasks to provide a range of opportunities for students to demonstrate the key knowledge and key skills in the outcomes.

The areas of study and key knowledge and key skills listed for the outcomes should be used for course design and the development of learning activities and assessment tasks.

Assessment of levels of achievement

The student's level of achievement in Unit 4 will be determined by School-assessed Coursework. School-assessed Coursework tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe.

Where teachers provide a range of options for the same School-assessed Coursework task, they should ensure that the options are of comparable scope and demand.

The types and range of forms of School-assessed Coursework for the outcomes are prescribed within the study design. VCAA publishes *Advice for teachers* for this study, which includes advice on the design of assessment tasks and the assessment of student work for a level of achievement

Teachers will provide to the VCAA a numerical score representing an assessment of the student's level of achievement. The score must be based on the teacher's assessment of the performance of each student on the tasks set out in the following table.

Contribution to final assessment

School-assessed Coursework for Unit 4 will contribute 24 per cent to the study score.

Outcomes	Marks allocated*	Assessment tasks
<p>Outcome 1</p> <p>Explain consciousness as a continuum, compare theories about the purpose and nature of sleep, and elaborate on the effects of sleep disruption on a person's functioning.</p>	30	<p>Analysis and evaluation of stimulus material using at least one task selected from:</p> <ul style="list-style-type: none"> • annotations of at least two practical activities from a practical work folio • comparison of different states of consciousness • a report of a student investigation • analysis of data including generalisations and conclusions • media analysis/response • a response to a set of structured questions • a reflective learning journal/blog related to selected activities or in response to an issue • a test (approximately 50 minutes or not exceeding 1000 words for each task)
<p>Outcome 2</p> <p>Explain the concepts of mental health and mental illness including influences of risk and protective factors, apply a biopsychosocial approach to explain the development and management of specific phobia, and explain the psychological basis of strategies that contribute to mental wellbeing.</p>	30	<p>Application of a biopsychosocial approach using at least one task (which is different from the type of task/s for Outcome 1) selected from:</p> <ul style="list-style-type: none"> • annotations of at least two practical activities from a practical work folio • analysis of the development of specific phobia or the maintenance of mental health • a report of a student investigation • analysis of data including generalisations and conclusions • media analysis/response • a response to a set of structured questions • a reflective learning journal/blog related to selected activities or in response to an issue • a test (approximately 50 minutes or not exceeding 1000 words for each task)
<p>Outcome 3</p> <p>Design and undertake a practical investigation related to mental processes and psychological functioning, and present methodologies, findings and conclusions in a scientific poster.</p>	30	<p>A structured scientific poster according to the VCAA template (not exceeding 1000 words)</p>
Total marks	90	

*School-assessed Coursework for Unit 4 contributes 24 per cent.

Practical work and assessment

Practical work is a central component of learning and assessment. As a guide, between 2 and 4 hours of class time should be devoted to student practical work and investigations for each of Areas of Study 1 and 2. For Unit 3, between 7 and 10 hours of class time should be devoted to the investigation to be undertaken in either Unit 3 or Unit 4, or across both Units 3 and 4, including the writing of the sections of the scientific poster.

External assessment

The level of achievement for Units 3 and 4 is also assessed by an end-of-year examination.

Contribution to final assessment

The examination will contribute 60 per cent.

End-of-year examination

Description

The examination will be set by a panel appointed by the VCAA. All the key knowledge that underpins the outcomes in Units 3 and 4 and the cross-study key science skills are examinable.

Conditions

The examination will be completed under the following conditions:

- Duration: 2.5 hours.
- Date: end-of-year, on a date to be published annually by the VCAA.
- VCAA examination rules will apply. Details of these rules are published annually in the [VCE and VCAL Administrative Handbook](#).
- The examination will be marked by assessors appointed by the VCAA.

Further advice

The VCAA publishes specifications for all VCE examinations on the VCAA website. Examination specifications include details about the sections of the examination, their weighting, the question format/s and any other essential information. The specifications are published in the first year of implementation of the revised Units 3 and 4 sequence together with any sample material.