The Australian Curriculum

Learning Areas:

Science

Subject:

Psychological Science

Levels:
Unit 1, Unit 2, Unit 3, Unit 4

Bands:

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Psychological Science

ACARA Acknowledgement

This document was produced by the National Psychology Curriculum Roundtable, supported by the Australian Psychological Society, and including curriculum representatives from each State and Territory in Australia. The document is modelled on the ACARA Science curricula, particularly that of Earth and Environmental Sciences (ACARA EES, 2014). Learning outcomes have been fashioned to parallel those of the other Science curricula, and the Aims, Inquiry Skills and Human Endeavour concept statements are either identical or very similar to the EES curriculum. In the introductory sections, in order to be as consistent as possible with the existing ACARA Science curricula, large sections of the EES curriculum have been quoted, and highlighted.

Psychological Science

Rationale and Aims

Rationale

Psychology is the science that seeks to understand behaviour and mental processes, including thoughts, emotions, and motivations. The goals of psychological science are to understand, explain, predict and modify behaviour. There are a variety of theoretical approaches to explaining behaviour, including the biological, evolutionary, psychodynamic, behavioural, cognitive and humanistic perspectives. Descriptive, correlational, and experimental methodological approaches are used, and both quantitative and qualitative data are important, depending on the research context.

Psychological science has many subfields, such as biological psychology, cognitive psychology, developmental psychology, social and cultural psychology, personality and individual differences, learning, motivation and emotion. Human behaviour can be studied at the individual, group, organisational, or societal levels, as well as examining the interactions between these levels. Apart from research careers in psychological science, further training in professional psychology can lead to a number of career specialisations including clinical neuropsychology, clinical psychology, community psychology, counselling psychology, educational and developmental psychology, forensic psychology, health psychology, organisational psychology and sports and exercise psychology.

Undertaking study in psychological science should equip you with a unique set of skills that range from communication (typical of humanities) to numeracy (typical of a science degree), thus emphasising the fact that although the primary methodologies of psychology are those of science, the primary subject matter of psychological science (human behaviour) is shared with the social sciences and humanities. Thus, psychological knowledge is used extensively in many different disciplines and professions, and is known as a "hub" science and a social science.

The unique skills and attributes gained from the study of the discipline include psychology discipline knowledge and its application, research methods, critical and creative thinking skills, values and ethics, communication and interpersonal skills, and learning and the application of psychological science. These attributes overlap with the science inquiry skills and general science capabilities mentioned toward the end of this Background section.

An important concept in psychological science is *psychological literacy*, which encapsulates the above capabilities, and can be defined as the capacity to adaptively and intentionally use psychological knowledge and skills to achieve personal, professional and societal goals. There are various domains of application of psychological principles, including the self and close others, local communities and global communities. Psychological literacy is also related to the more interdisciplinary concept of adaptive cognition, which is defined as global ways of thinking (and consequently behaving) that are beneficial to one's (and other's) survival and well-being. Just as it is important for the public to be (generally) scientifically literate, it is also important for the public to be (specifically) psychologically literate. It has also been argued from a number of perspectives that a high level of psychological literacy necessarily entails behaving in a way that reflects a consideration of the long-term needs of local and global communities. Why is this important? We know that most problems in the world today (e.g., conflicts based on in-group/out-group thinking; life-style diseases such as obesity to mention only a few) are psychologically based. Unfortunately, our limited brains make it difficult for us to: (a) realise the sociocultural and political factors that lead to these problems and (b) subsequently work together to create solutions. However, through studying psychological science as part of the national curriculum, there is the opportunity to understand how we can change behaviour both in ourselves and in others.

Psychological Science builds on the content of the Foundation to Year 10 Australian Curriculum: Science. In particular, the subject provides students with opportunities to explore the theories and evidence that frame our understanding of human behaviour, using scientific methods. By studying psychological science, students have the opportunity not only to become familiar with the theories, evidence, and methods of psychological science, but also to apply psychological principles in their own lives. This is the start of a journey toward psychological literacy.

"Studying senior secondary Science provides students with a suite of skills and understandings that are valuable to a wide range of further study pathways and careers. In this subject, students develop their investigative, analytical and communication skills and apply these to their understanding of science issues in order to engage in public debate, solve problems and make evidence-based decisions about contemporary issues. The knowledge, understanding and skills introduced in this subject will encourage students to become confident, active citizens who can competently use diverse methods of inquiry, and will provide a foundation for further studies or employment in… science-related fields" (ESS, 2014, p.4).

Aims

Psychological Science aims to develop students':

- interest in psychological science and their appreciation of how this knowledge can be used to understand contemporary issues
- understanding of human behaviour as the result of ontogenetic and phylogenetic development within the context of the biopsychosocial model
- appreciation of the complex interactions, involving multiple parallel processes, that continually influence human behaviour
- understanding that psychological science knowledge has developed over time; is used in a variety of contexts; and influences, and is influenced by, social, economic, cultural and ethical considerations
- ability to conduct a variety of field, research and laboratory investigations involving collection and analysis of qualitative and quantitative data, and interpretation of evidence
- ability to critically evaluate psychological science concepts, interpretations, claims and conclusions with reference to evidence
- ability to communicate psychological understanding, findings, arguments and conclusions using appropriate representations, modes and genres.

Organisation

Overview of the senior secondary Australian Curriculum

“ACARA has developed senior secondary Australian Curriculum for English, Mathematics, Science and History according to a set of design specifications. The ACARA Board approved these specifications following consultation with state and territory curriculum, assessment and certification authorities.

The senior secondary Australian Curriculum specifies content and achievement standards for each senior secondary subject. Content refers to the knowledge, understanding and skills to be taught and learned within a given subject. Achievement standards refer to descriptions of the quality of learning (the depth of understanding, extent of knowledge and sophistication of skill) expected of students who have studied the content for the subject.

The senior secondary Australian Curriculum for each subject has been organised into four units. The last two units are cognitively more challenging than the first two units. Each unit is designed to be taught in about half a 'school year' of senior secondary studies (approximately 50–60 hours duration including assessment and examinations). However, the senior secondary units have also been designed so that they may be studied singly, in pairs (that is, year-long), or as four units over two years.

State and territory curriculum, assessment and certification authorities are responsible for the structure and organisation of their senior secondary courses and will determine how they will integrate the Australian Curriculum content and achievement standards into their courses. They will continue to be responsible for implementation of the senior secondary curriculum, including assessment, certification and the attendant quality assurance mechanisms. Each of these authorities acts in accordance with its respective legislation and the policy framework of its state government and Board. They will determine the assessment and certification specifications for their local courses that integrate the Australian Curriculum content and achievement standards and any additional information, guidelines and rules to satisfy local requirements including advice on entry and exit points and credit for completed study.

The senior secondary Australian Curriculum for each subject should not, therefore, be read as a course of study. Rather, it is presented as content and achievement standards for integration into state and territory courses” (ACARA EES, 2014, p. 5).

Senior secondary Science subjects

The Australian Curriculum senior secondary Science subjects include:

- Biology
- Chemistry
- Earth and Environmental Science
- Physics

This document provides a curriculum framework for the additional Science subject of Psychological Science.

Structure of Psychological Science

Units

In Psychological Science, students develop their understanding of human thinking and behaviour. There are four units:
Unit 1: Introduction: biopsychosocial model across the life-span
Unit 2: Social psychology, emotion, and individual differences
Unit 3: Sensation, perception, and cognition
Unit 4: Neuroscience and mental health and well-being

In Units 1 and 2, students are introduced to psychology as a scientific discipline and as an evidence-based profession. In Unit 1, students use the biopsychosocial model to understand the complexities of human behaviour, become familiar with a variety of methodological approaches and the importance of rigorous investigation techniques. In Unit 2, students are introduced to the theory, evidence and methodological approaches regarding social behaviour, individual differences, and diversity.

In Units 3 and 4, students are introduced to the fundamentals of cognition and neuroscience, and applications to mental health and well-being. In Unit 3, students examine information processing mechanisms underlying thought, feeling and behaviour. In Unit 4, students consider the biological bases of psychological phenomena, the mechanisms underlying disordered behaviour, and the complexities of concepts such as resilience and well-being.

"Each unit includes:

- Unit descriptions – short descriptions of the purpose of and rationale for each unit
- Learning outcomes – six to eight statements describing the learning expected as a result of studying the unit
- Content descriptions – descriptions of the core content to be taught and learned, organised into three strands:
    - *Science Inquiry Skills*
    - *Science as a Human Endeavour*
    - *Science Understanding (organised in sub-units)."* (ACARA EES, 2014, p. 6)

Organisation of content

Science strand descriptions

"The Australian Curriculum: Science has three interrelated strands: *Science Inquiry Skills, Science as a Human Endeavour* and *Science Understanding*. These strands are used to organise the Science learning area from Foundation to Year 12. In the senior secondary Science subjects, the three strands build on students' learning in the F-10 Australian Curriculum: Science.

In the practice of science, the three strands are closely integrated: the work of scientists reflects the nature and development of science, is built around scientific inquiry, and seeks to respond to and influence society. Students' experiences of school science should mirror this multifaceted view of science. To achieve this, the three strands of the Australian Curriculum: Science should be taught in an integrated way. The content descriptions for *Science Inquiry Skills*, *Science as a Human Endeavour* and *Science Understanding* have been written so that this integration is possible in each unit." (ACARA EES, 2014, p. 6)

Science Inquiry Skills

"Science inquiry involves identifying and posing questions; planning, conducting and reflecting on investigations; processing, analysing and interpreting data; and communicating findings. This strand is concerned with evaluating claims, investigating ideas, solving problems, reasoning, drawing valid conclusions, and developing evidence-based arguments.

Science investigations are activities in which ideas, predictions or hypotheses are tested and conclusions are drawn in response to a question or problem. Investigations can involve a range of activities, including experimental testing, field work, locating and using information sources, conducting surveys, and using modelling and simulations. The investigation design will depend on the context and subject of the investigation.

In science investigations, the collection and analysis of data to provide evidence plays a major role. This can involve collecting or extracting information and reorganising data in the form of tables, graphs, flow charts, diagrams, prose, keys, spreadsheets and databases. The analysis of data to identify and select evidence, and the communication of findings, involve the selection, construction and use of specific representations, including mathematical relationships, symbols and diagrams.

Through the senior secondary Science subjects, students will continue to develop generic science inquiry skills, building on the skills acquired in the F-10 Australian Curriculum: Science. These generic skills are described below and will be explicitly taught and assessed in each unit. In addition, each unit provides more specific skills to be taught within the generic science inquiry skills; these specific skills align with the *Science Understanding* and *Science as a Human Endeavour* content of the unit.

The generic science inquiry skills are:

- Identifying, researching and constructing questions for investigation; proposing hypotheses; and predicting possible outcomes
- Designing investigations, including the procedure/s to be followed, the materials required and the type and amount of primary and/or secondary data to be collected; conducting risk assessments; and considering ethical research
- Conducting investigations, including using equipment and techniques safely, competently and methodically for the collection of valid and reliable data

- Representing data in meaningful and useful ways; organising and analysing data to identify trends, patterns and
- relationships; recognising error, uncertainty and limitations in data; and selecting, synthesising and using evidence to construct and justify conclusions
- Interpreting scientific and media texts and evaluating processes, claims and conclusions by considering the quality of available evidence; and using reasoning to construct scientific arguments
- Selecting, constructing and using appropriate representations to communicate understanding, solve problems and make predictions
- Communicating to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes.

The senior secondary Science subjects have been designed to accommodate, if appropriate, an extended scientific investigation within each pair of units. States and territories will determine whether there are any requirements related to an extended scientific investigation as part of their course materials." (ACARA EES, 2014, pp.6-7).

Science as a Human Endeavour

"Through science, we seek to improve our understanding and explanations of the natural world. The *Science as a Human Endeavour* strand highlights the development of science as a unique way of knowing and doing, and explores the use and influence of science in society.

As science involves the construction of explanations based on evidence, the development of science concepts, models and theories is dynamic and involves critique and uncertainty. Science concepts, models and theories are reviewed as their predictions and explanations are continually re-assessed through new evidence, often through the application of new technologies. This review process involves a diverse range of scientists working within an increasingly global community of practice and can involve the use of international conventions and activities such as peer review.

The use and influence of science are shaped by interactions between science and a wide range of social, economic, ethical and cultural factors. The application of science may provide great benefits to individuals, the community and the environment, but may also pose risks and have unintended consequences. As a result, decision making about socio-scientific issues often involves consideration of multiple lines of evidence and a range of stakeholder needs and values. As an ever-evolving body of knowledge, science frequently informs public debate, but is not always able to provide definitive answers.

Across the senior secondary Science subjects, the same set of *Science as a Human Endeavour* content descriptions is used for Units 1 and 2 of the subjects; and another set for Units 3 and 4. This consistent approach enables students to develop a rich appreciation of the complex ways in which science interacts with society, through the exploration of *Science as a Human Endeavour* concepts across the subjects and in multiple contexts.

'*Examples in context*' will be developed to illustrate possible contexts related to *Science Understanding* content, in which students could explore *Science as a Human Endeavour* concepts. These will be made available to complement the final online curriculum. Each *Example in context* will be aligned to the relevant sub-unit in Science Understanding and will include links to the relevant *Science as a Human Endeavour* content descriptions." (ACARA EES, 2014, p. 7-8)

Science Understanding

"Science understanding is evident when a person selects and integrates appropriate science concepts, models and theories to explain and predict phenomena, and applies those concepts, models and theories to new situations. Models in science can include diagrams, physical replicas, mathematical representations, word-based analogies (including laws and principles) and computer simulations. Development of models involves selection of the aspects of the system/s to be included in the model, and thus models have inherent approximations, assumptions and limitations.

The *Science Understanding* content in each unit develops students' understanding of the key concepts, models and theories that underpin the subject, and of the strengths and limitations of different models and theories for explaining and predicting complex phenomena.
Science understanding can be developed through the selection of contexts that have relevance to and are engaging for students. The Australian Curriculum: Science has been designed to provide jurisdictions, schools and teachers with the flexibility to select contexts that meet the social, geographic and learning needs of their students." (ACARA EES, 2014, p. 8)

Organisation of achievement standards

The Psychological Science achievement standards are organised by two dimensions: 'Psychological Science Concepts, Models and Applications' and 'Psychological Science Inquiry Skills'. They describe five levels of student achievement.

'Psychological Science Concepts, Models and Applications' "describes the knowledge and understanding students demonstrate with reference to the content of the *Science Understanding* and *Science as a Human Endeavour* strands of the curriculum" (ACARA EES, 2014, p. 8). 'Psychological Science Inquiry Skills' "describes the skills students demonstrate when investigating the content developed through the strands of *Science Understanding* and *Science as a Human Endeavour*.

Senior secondary achievement standards have been written for each Australian Curriculum senior secondary subject. The achievement standards provide an indication of typical performance at five different levels (corresponding to grades A to E) following the completion of study of senior secondary Australian Curriculum content for a pair of units. They are broad statements of understanding and skills that are best read and understood in conjunction with the relevant unit content. They are structured to reflect key dimensions of the content of the relevant learning area. They will be eventually accompanied by illustrative and annotated samples of student work/ performance/ responses. The achievement standards will be refined empirically through an analysis of samples of student work and responses to assessment tasks: they cannot be maintained *a priori* without reference to actual student performance. Inferences can be drawn about the quality of student learning on the basis of observable differences in the extent, complexity, sophistication and generality of the understanding and skills typically demonstrated by students in response to well-designed assessment activities and tasks" (ACARA EES, 2014, p. 8).

"In the short term, achievement standards will inform assessment processes used by curriculum, assessment and certifying authorities for course offerings based on senior secondary Australian Curriculum content.

ACARA has made reference to a common syntax (as a guide, not a rule) in constructing the achievement standards across the learning areas. The common syntax that has guided development is as follows:

- Given a specified context (as described in the curriculum content)
- With a defined level of consistency/accuracy (the assumption that each level describes what the student does well, competently, independently, consistently)
- Students perform a specified action (described through a verb)
- In relation to what is valued in the curriculum (specified as the object or subject)
- With a defined degree of sophistication, difficulty, complexity (described as an indication of quality)

Terms such as 'analyse' and 'describe' have been used to specify particular action but these can have everyday meanings that are quite general. ACARA has therefore associated these terms with specific meanings that are defined in the senior secondary achievement standards glossary and used precisely and consistently across subject areas" (ACARA EES, 2014, p.9).

Links to Foundation to Year 10

Progression from the F-10 Australian Curriculum: Science

The Psychological Science curriculum continues to develop student understanding and skills from across the three strands of the F-10 Australian Curriculum: Science.

In the *Science Understanding* strand, the Psychological Science curriculum draws on knowledge and understanding derived from science methodologies. *Moreover, the Psychological Science curriculum continues to develop the key concepts introduced in the Biological Sciences sub-strand, that is, that a diverse range of living things have evolved on Earth over hundreds of millions of years, and that living things are interdependent and interact with each other and with their environment*.

Mathematical skills expected of students studying Psychological Science

The Psychological Science curriculum "requires students to use the mathematical skills they have developed through the F-10 Australian Curriculum: Mathematics, in addition to the numeracy skills they have developed through the Science Inquiry Skills strand of the Australian Curriculum: Science.
Within the Science Inquiry Skills strand, students are required to gather, represent and analyse numerical data to identify the evidence that forms the basis of their scientific arguments, claims or conclusions. In gathering and

recording numerical data, students are required to make measurements with an appropriate degree of accuracy and to represent measurements using appropriate units.

Students may need to be taught to recognise when it is appropriate to join points on a graph and when it is appropriate to use a line of best fit. They may also need to be taught how to construct a straight line that will serve as the line of best fit for a set of data presented graphically.
It is assumed that students will be able to competently:

- perform calculations involving addition, subtraction, multiplication and division of quantities
- perform approximate evaluations of numerical expressions
- express fractions as percentages, and percentages as fractions
- calculate percentages
- recognise and use ratios
- transform decimal notation to power of ten notation
- substitute physical quantities into an equation using consistent units so as to calculate one quantity and check the dimensional consistency of such calculations
- solve simple algebraic equations
- comprehend and use the symbols/notations <,>, Δ, ≈
- translate information between graphical, numerical and algebraic forms
- distinguish between discrete and continuous data and then select appropriate forms, variables and scales for constructing graphs
- construct and interpret frequency tables and diagrams, pie charts and histograms
- describe and compare data sets using mean, median and inter-quartile range
- interpret the slope of a linear graph" (ACARA EES, 2014, pp. 9-10).

Representation of General capabilities

"*Literacy* is important in students' development of *Science Inquiry Skills* and their understanding of content presented through the *Science Understanding* and *Science as a Human Endeavour* strands. Students gather, interpret, synthesise and critically analyse information presented in a wide range of genres, modes and representations (including text, flow diagrams, symbols, graphs and tables). They evaluate information sources and compare and contrast ideas, information and opinions presented within and between texts. They communicate processes and ideas logically and fluently and structure evidence-based arguments, selecting genres and employing appropriate structures and features to communicate for specific purposes and audiences.

Numeracy is key to students' ability to apply a wide range of *Science Inquiry Skills*, including making and recording observations; ordering, representing and analysing data; and interpreting trends and relationships. They employ numeracy skills to interpret complex spatial and graphic representations, and to appreciate the ways in which Earth systems are structured, interact and change across spatial and temporal scales. They engage in analysis of data, including issues relating to reliability and probability, and they interpret and manipulate mathematical relationships to calculate and predict values.

Information and Communication Technology (ICT) capability is a key part of *Science Inquiry Skills*. Students use a range of strategies to locate, access and evaluate information from multiple digital sources; to collect, analyse and represent data; to model and interpret concepts and relationships; and to communicate and share science ideas, processes and information. Through exploration of *Science as a Human Endeavour* concepts, students assess the impact of ICT on the development of science and the application of science in society, particularly with regard to collating, storing, managing and analysing large data sets.

Critical and creative thinking is particularly important in the science inquiry process. Science inquiry requires the ability to construct, review and revise questions and hypotheses about increasingly complex and abstract scenarios and to design related investigation methods. Students interpret and evaluate data; interrogate, select and cross-reference evidence; and analyse processes, interpretations, conclusions and claims for validity and reliability, including reflecting on their own processes and conclusions. Science is a creative endeavour and students devise innovative solutions to problems, predict possibilities, envisage consequences and speculate on possible outcomes as they develop *Science Understanding* and *Science Inquiry Skills.* They also appreciate the role of critical and creative individuals and the central importance of critique and review in the development and innovative application of science.

Personal and social capability is integral to a wide range of activities in …Science, as students develop and practise skills of communication, teamwork, decision-making, initiative-taking and self-discipline with increasing confidence and sophistication. In particular, students develop skills in both independent and collaborative investigation; they employ self-management skills to plan effectively, follow procedures efficiently and work safely; and they use collaboration skills to conduct investigations, share research and discuss ideas. In considering aspects of *Science as a Human Endeavour,* students also recognise the role of their own beliefs and attitudes in

their response to science issues and applications, consider the perspectives of others, and gauge how science can affect people's lives.

Ethical understanding is a vital part of science inquiry. Students evaluate the ethics of experimental science, codes of practice, and the use of scientific information and science applications. They explore what integrity means in science, and they understand, critically analyse and apply ethical guidelines in their investigations. They consider the implications of their investigations on others, the environment and living organisms. They use scientific information to evaluate the claims and actions of others and to inform ethical decisions about a range of social, environmental and personal issues and applications of science.

Intercultural understanding is fundamental to understanding aspects of *Science as a Human Endeavour*, as students appreciate the contributions of diverse cultures to developing science understanding and the challenges of working in culturally diverse collaborations. They develop awareness that raising some debates within culturally diverse groups requires cultural sensitivity, and they demonstrate open-mindedness to the positions of others. Students also develop an understanding that cultural factors affect the ways in which science influences and is influenced by society" (ACARA EES, 2014, pp.10-11).

Representation of Cross-curriculum priorities

While the significance of the cross-curriculum priorities for Psychological Science varies, "there are opportunities for teachers to select contexts that incorporate the key concepts from each priority.
The… curriculum provides an opportunity for students to engage with *Aboriginal and Torres Strait Islander histories and cultures*. It acknowledges that Aboriginal and Torres Strait Islander people have longstanding scientific knowledge traditions that inform understanding… In exploring scientific knowledge… students could develop an understanding that Aboriginal and Torres Strait Islander people have particular ways of knowing the world and continue to be innovative in providing significant contributions to development in science. Students could investigate examples of Aboriginal and Torres Strait Islander science and the ways traditional knowledge and Western scientific knowledge can be complementary" (ACARA EES, 2014, p. 11).

"Students could investigate a wide range of contexts that draw *on Asia and Australia's engagement with Asia* …. Through an examination of developments in… Science, students could appreciate that the Asia region plays an important role in scientific research and development, including through collaboration with Australian scientists" (ACARA EES, 2014, p.11).

The *Sustainability* priority is addressed in the Psychological Science curriculum indirectly through requiring students to understand the factors which drive behaviour, and directly through Examples in Context which includes a consideration of how cognitive fallacies contribute to maladaptive behaviour with regard to sustainability (e.g., optimism bias). Students appreciate that Psychological Science provides the basis for decision making in many areas of society and that these decisions can impact upon the future of human societies. They understand that this is why psychological literacy is a particularly important attribute of the educated public. In particular, students understand the importance of using science to predict possible effects of human activity and to develop management plans or alternative technologies that minimise these effects and provide for a more sustainable future.

Safety

"Science learning experiences may involve the use of potentially hazardous substances and/or hazardous equipment. It is the responsibility of the school to ensure that duty of care is exercised in relation to the health and safety of all students and that school practices meet the requirements of the Work Health and Safety Act 2011, in addition to relevant state or territory health and safety guidelines.
When state and territory curriculum authorities integrate the Australian Curriculum into local courses, they will include more specific advice on safety.
For further information about relevant guidelines, contact your state or territory curriculum authority." (ACARA EES, 2014, p. 12)

Animal (including human) ethics

"Through a consideration of research ethics as part of *Science Inquiry Skills*, students will examine their own ethical position, draw on ethical perspectives when designing investigation methods, and ensure that any activities that impact on living organisms comply with the *Australian code of practice for the care and use of animals for scientific purposes 7th edition* (2004) (http://www.nhmrc.gov.au/guidelines/publications/ea16).

Any teaching activities that involve the care and use of, or interaction with, animals must comply with the *Australian code of practice for the care and use of animals for scientific purposes 7th edition*, in addition to relevant state or territory guidelines.

When state and territory curriculum authorities integrate the Australian Curriculum into local courses, they will include more specific advice on the care and use of, or interaction with, animals.

A primary animal subject in psychological science is, of course, human beings. Relevant codes include the *National Statement on Ethical Conduct in Human Research* (2007) – Updated May 2015 (http://www.nhmrc.gov.au/guidelines/publications/e72) and the *Australian Code for the Responsible conduct of Research* (2007) (http://www.nhmrc.gov.au/guidelines/publications/r39)

For further information about relevant guidelines or to access your local Animal or Human Ethics Committee, contact your state or territory curriculum authority." (ACARA EES, 2014, p. 12)

Psychological Science

Unit 1: The biopsychosocial model across the lifespan

Unit Description

Understanding the complexities of human behaviour involves three interacting approaches: the biological, the psychological, and the socio-cultural. Each of these perspectives can be studied independently but they also interact with each other in producing the vast range and diversity of human behaviour. In this unit, students will build upon their existing knowledge of science and expand their understanding of the theoretical underpinning of psychological science by exploring the definition of the discipline and by focussing on psychological science's perspective on two long-standing debates: the competition between free will and determinism, and the tension between nature and nurture in producing behaviour. The exploration of psychology both as a discipline and as a practice will be considered, leading into a focus on the career prospects available in studying psychological science.

Students will examine the fundamental approaches to explanation in psychological science by exploring the biopsychosocial model. Learning theory including classical and operant conditioning and observation learning are each used as examples of how the level of explanation in psychological science can operate both independently and in interaction with the other approaches in producing, explaining, predicting and controlling behaviour. Through the investigation of research methods in psychological science, students explore how scientific knowledge is used to offer valid explanations and provide reliable predictions regarding psychological phenomena and the ways in which these interact with socio-cultural, economic and environmental factors.

Students use science inquiry skills to gather information about psychological phenomena; in particular, students will be introduced to a range of approaches to data gathering including experimental, observational, quantitative and qualitative techniques. Sources of error and bias in experimentation are also reviewed with a view to ensuring that the observations made are reliable, valid and unbiased.

Learning Outcomes

By the end of this unit, students:

- understand the scope of psychology as a science which operates both as a discipline and a practice
- understand the variety of career prospects arising from study in psychological science
- understand the biopsychosocial model as the focus of explanation in psychological science
- use the biopsychosocial model to explore the various aspects of learning theory as they apply to classical conditioning, operant conditioning and observational learning
- use science inquiry skills to collect, analyse and communicate primary and secondary data on psychological phenomena; and use these to inform approaches to theory-making in psychological science
- evaluate, with reference to empirical evidence, problems associated with bias and inconsistency by exploring issues of reliability , validity, demand characteristics and experimenter expectation
- communicate psychological understanding using qualitative and quantitative representations in appropriate modes and genres.

Content descriptions

Science Inquiry Skills (Psychological Science Unit 1)

Using theoretically based evidence, identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes. (ACSPS001)

Design investigations, including the procedure/s to be followed, the information required and the type and amount of primary and/or secondary data to be collected; conduct risk assessments; and consider research ethics, including animal (and human) ethics. (ACSPS002)

Conduct investigations safely, competently and methodically for the collection of valid and reliable data. (ACSPS003)

Represent data in meaningful and useful ways; organise and analyse data to identify trends, patterns and relationships; qualitatively describe sources of measurement error, uncertainty, and limitations in data; and select, synthesise, and use evidence to make and justify conclusions. (ACSPS004)
Interpret a range of scientific and media texts, and evaluate processes, claims and conclusions by considering the quality of available evidence; use reasoning to construct scientific arguments. (ACSPS005)

Select, construct and use appropriate representations to communicate conceptual understanding, solve problems and make predictions. (ACSPS006)

Communicate to specific audiences and for specific purposes using appropriate language, genres and modes, including research reports. (ACSPS007)

Science as a Human Endeavour (Units 1 & 2)

Science is a global enterprise that relies on clear communication, international conventions, peer review, and reproducibility. (ACSPS008)

Development of complex models and/or theories often requires a wide range of evidence from multiple individuals and across disciplines. (ACSPS009)

Advances in science understanding in one field can influence other areas of science, technology and engineering. (ACSPS010)

The use of scientific knowledge is influenced by social, economic, cultural and ethical considerations. (ACSPS011)

The use of scientific knowledge may have beneficial and/or harmful and/or unintended consequences. (ACSPS012)

Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions. (ACSPS013)

Scientific knowledge can be used to develop and evaluate projected economic, social, and environmental impacts and to design action for sustainability. (ACSPS014)

Science Understanding

Defining psychological science

Psychology is a developing science and as a result there continue to be a number of ongoing debates in psychological science including the competing accounts of free will *versus* determinism and the nature *versus* nurture debates. (ACSPS015)

Psychology is both a discipline and a practice and as a science this dual focus translates directly into evidence-based practice. (ACSPS016)

Psychological science provides a broad range of career options to students from basic research through to roles in behaviour change in settings ranging from clinics to global organisations. (ACSPS017)

Introducing the biopsychosocial model

The biopsychosocial model underpins the current approach to explaining all psychological phenomena. (ACSPS018)

The biological level focusses on the neuroanatomical, neurophysiological and neurochemical explanations of behaviour including the consideration of the genetic basis of behaviour and gene-environment interactions. (ACSPS019)

The psychological component includes the behavioural, cognitive and motivational/emotional levels. (ACSPS020)

The behavioural level focusses upon experientially learned behaviours including the nature of conditioning, learning theory and the principles of reinforcement. (ACSPS021)

The cognitive level focusses on the importance of internal mental processes including memory, language and thought to explain behaviour and individual differences. (ACSPS022)

The motivational level focusses on the integrative motivational systems and emotional processes that influence cognition and that drive behaviour. (ACSPS023)

The sociocultural level focusses on the influences that other people exert upon the individual including group processes and cultural context. (ACSPS024)

Each of these approaches has both strengths and limitations but most investigators now acknowledge that all levels of explanation are critical to understanding the complexity of psychological phenomena. (ACSPS025)

An excellent example of a process which exemplifies each of these approaches to the study of psychological science is learning theory. (ACSPS026)

Classical conditioning involves learning by associating two stimuli which provoke a response, and the efficacy of classical conditioning is affected by the schedule of conditioning. (ACSPS027)

Operant conditioning involves learning from the consequences of behaviour; a consequence that encourages a behaviour is reinforcement, and one that discourages it is punishment. (ACSPS028)

Reinforcement and punishment can be either negative or positive, and their efficacy is affected by scheduling, social and personal context, past experiences, and cognitive processes such as attention. (ACSPS029)

Social learning, also known as vicarious or observational learning, involves learning from watching others behave and is affected by a variety of personal, social and environmental factors. (ACSPS030)

The developmental trajectory influences each of the levels of explanation in the biopsychosocial model, such that there are changes in processes across the lifespan. (ACSPS031)

Research methods in psychological science

The processes of induction and deduction are the combined foundational processes which underpin psychological inquiry. (ACSPS032)

The scientific method occupies a central role in psychological science and empirical investigations in psychological science may be experimental or observational, quantitative or qualitative. (ACSPS033)

It is possible to make a clear distinction between the observation of coincidence or correlation and the determination of cause in experimental studies. (ACSPS034)

Sources of error in experimentation (including demand characteristics) can be reduced by a number of measures including random assignment and blinding. (ACSPS035)

The reliability and validity of measures is crucial in psychological investigation. (ACSPS036)

Ethical experimentation is an important issue for any experimental or non-experimental study in psychological science. (ACSPS037)

Psychological Science

Unit 2: Social processes and individual differences

Unit Description

Humans are social animals and we define ourselves in terms of the groups that we identify with and those that we do not. Students examine how groups are formed and the influence of the group upon the individual and of the individual upon the group.

We form attitudes through both personal and social experience and when these two factors conflict this can lead to cognitive dissonance. Attitudes and other forms of attribution and stereotyping can have significant effects on how other group members are perceived. Changing attitudes is a dynamic process which can be affected by persuasive messaging.

The study of individual differences comprises two major spheres of study: personality and intelligence. Both of these constructs can be considered from a biopsychosocial perspective. Both personality and intelligence exist along a continuum and the spectrum of difference is a function of how these constructs are measured. Individual differences are also important for an appreciation of diversity, particularly with regard to minority or disempowered groups (e.g., Aboriginal and Torres Strait Islander peoples; people of diverse sexuality and sexual identity; females; older people).

Through the investigation of appropriate contexts, students explore how group processes and individual differences have contributed to developing understanding of the structure of society. They investigate how scientific knowledge is used to offer valid explanations and reliable predictions, and the ways in which these interact with social, economic and cultural factors.

Students use inquiry skills to collect, analyse and interpret data relating to group process, personality and intelligence and consider the notions of giftedness, intellectual disability and personality disorder.

Learning Outcomes

By the end of this unit, students:

- understand how individuals influence and are influenced by each other particularly in the context of dynamic group processes and their effect upon self-concept, group membership and social identity
- understand how attitudes are developed and change; and the effects of cognitive dissonance, stereotyping and prejudice
- understand how theories and models have developed on the issue of defining and distinguishing the constructs of personality and intelligence; and the uses and limitations of the measurement and description of these in a range of contexts
- use science inquiry skills to collect, analyse and communicate primary and secondary data on personality and intelligence
- evaluate, with reference to empirical evidence, claims about race differences in intelligence and the construct of personality disorder
- communicate the understanding of personality and intelligence using qualitative and quantitative representations in appropriate modes and genres
- Communicate an understanding of the genesis of specific attitudes and behaviours toward minority and disempowered groups

Content descriptions

Science Inquiry Skills (Psychological Science Unit 2)

Using theoretically based evidence, identify, research, and construct questions for investigation; propose hypotheses; and predict possible outcomes. (ACSPS038)

Design investigations including the procedure/s to be followed, the information required and the type and amount of primary and/or secondary data to be collected; conduct risk assessments; and consider research ethics, and animal (including human) ethics. (ACSPS039)

Conduct investigations safely, competently and methodically for the collection of valid and reliable data. (ACSPS040)

Represent data in meaningful and useful ways; organise and analyse data to identify trends, patterns and relationships; qualitatively describe sources of measurement error, and uncertainty; and limitations in data; and select, synthesise, and use evidence to make and justify conclusions. (ACSPS041)

Interpret a range of scientific and media texts and evaluate processes, claims and conclusions by considering the quality of available evidence; use reasoning to construct scientific arguments. (ACSPS042)

Select, construct, and use appropriate representations to communicate conceptual understanding, solve problems, and make predictions. (ACSPS043)

Communicate to specific audiences and for specific purposes using appropriate language, genres and modes, including research reports. (ACSPS044)

Science as a Human Endeavour (Units 1 & 2)

Science is a global enterprise that relies on clear communication, international conventions, peer review and reproducibility. (ACSPS045)

Development of complex models and/or theories often requires a wide range of evidence from multiple individuals and across disciplines. (ACSPS046)

Advances in science understanding in one field can influence other areas of science, technology and engineering. (ACSPS047)

The use of scientific knowledge is influenced by social, economic, cultural and ethical considerations. (ACSPS048)

The use of scientific knowledge may have beneficial and/or harmful and/or unintended consequences. (ACSPS049)

Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions. (ACSPS050)

Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability. (ACSPS051)

Science Understanding

Social Psychology

Social psychology investigates the relationship between individuals and their effect on and how they are affected by others. (ACSPS052)

Group formation occurs in many contexts and individuals perform differently in groups as opposed to as individuals including the appearance of a number of unique processes such as self-concept, group membership, and social identity. (ACSPS053)

Both implicit and explicit attitudes produce an effect upon individual behaviour, and discrepancies between attitudes or between attitudes and behaviours can lead to cognitive dissonance. (ACSPS054)

Attitude change is a dynamic process which can be affected by persuasive messaging and advertising. (ACSPS055)

Stereotyping, prejudice and discrimination all affect how other group members are perceived and have significant impacts upon group processes and behaviour. (ACSPS056)

Prosocial and antisocial behaviours are important intergroup processes including attraction, aggression and the emergence of conflict. (ACSPS057)

Personality

Personality can be described as an enduring set of traits that characterise an individual's behaviour in different settings and across time. (ACSPS058)

Personality is also a socio-cultural construct, such that there are "state" as well as "trait" theories of personality. (ACSPS059)

Genetics contributes to the nature of personality and personality is subject to development across time. (ACSPS60)

Personality can be measured, and at its most extreme, it is expressed in the concept of personality disorder. (ACSPS061)

Intelligence

Intelligence has emerged as an important psychological construct and this can be affected by the genetic makeup, the socio-cultural environment, and the interaction between these factors. (ACSPS062)

The construct of intelligence has a long and chequered history and it has been used and misused in the context of stereotyping. (ACSPS063)

Intelligence features both general factors and specific factors and some investigators have proposed that there may be multiple intelligences. (ACSPS064)

Assessing intelligence has a long history and continues to be actively investigated today. The construct has been both used and misused in, for example, the debate on race differences in intelligence. (ACSPS065)

Minority and disempowered groups

The biopsychosocial model can be used to explain historical and current differences in the behaviour of male and female humans, and humans at different developmental stages, in Australian and other societies. (ACSPS066)

The biopsychosocial model can be used to explain current attitudes and behaviours toward people of diverse sexuality and sexual identity and people of different ages, as well as the disparity in mental health. (ACSPS067)

The biopsychosocial model can be used to explain current attitudes and behaviours towards Aboriginal and Torres Strait Islander people, as well as the disparities in health and life expectancy. (ACSPS068)

Achievement Statements: Units 1 and 2

Psychological Science concepts, models and applications (based on ACARA EES, 2014, pp.22-23 and ACARA BIO, 2013, pp.25-26)

A	B	C	D	E
For the psychological systems or phenomena studied, the student:	*For the psychological systems or phenomena studied, the student:*	*For the psychological systems or phenomena studied, the student:*	*For the psychological systems or phenomena studied, the student:*	*For the psychological systems or phenomena studied, the student:*
- analyses how psychological systems and their components are interrelated (e.g., biopsychosocial model; cognitive dissonance)	- explains how psychological system components are interrelated	- describes psychological system components	- identifies psychological system components	- identifies some psychological system components
- analyses how psychological systems have developed phylogenetically and ontogenetically	- explains how psychological systems have developed phylogenetically and ontogenetically	- describes the ways in which psychological systems have developed phylogenetically and ontogenetically	- identifies some ways in which psychological systems have developed phylogenetically or ontogenetically	- describes some aspects of psychological system phylogenetic or ontogenetic development
- "explains the theories and model/s used to explain the system and the aspects of the system they include" [BIO & ESS]	- "describes the theories and model/s used to explain the system" [BIO & EES]	- "describes a theory or model used to explain the system" [BIO & ESS]	- "identifies aspects of a theory or model related to the system" [BIO & EES]	- "identifies aspects of a theory or model related to parts of the system" [BIO & EES]
- "applies theories and models of systems and processes to explain phenomena, interpret complex problems and make reasoned, plausible predictions in unfamiliar contexts" [BIO & EES]	- "applies theories and models of systems and processes to explain phenomena, interpret problems and make plausible predictions in unfamiliar contexts" [BIO & EES]	- "applies theories or models of systems and processes to explain phenomena, interpret problems and make plausible predictions in familiar contexts" [BIO & EES]	- "describes phenomena, interprets simple problems and makes simple predictions in familiar contexts" [BIO & ESS]	- "describes phenomena and makes simple predictions in familiar contexts" [BIO & ESS]

For the psychological contexts studied, the students:	*For the psychological contexts studied, the students:*	*For the psychological contexts studied, the students:*	*For the psychological contexts studied, the students:*	*For the psychological contexts studied, the students:*
- analyses the role of collaboration, debate and review, and technologies, in the development of psychological theories and models [based on EES & BIO]	- explains the role of collaboration, debate and review, and technologies, in the development of psychological theories and models [based on EES & BIO]	- describes the role of collaboration and review, and technologies, in the development of psychological theories or models [based on EES & BIO]	- describes the role of communication and new evidence in the development of psychological knowledge [based on EES & BIO]	- identifies that psychological knowledge has changed over time [based on EES & BIO]
- evaluates how psychological science has been used in concert with other sciences to meet diverse needs and inform decision making; and how these applications are influenced by interacting social, economic and ethical factors [based on EES & BIO]	- explains how psychological science has been used to meet diverse needs and inform decision making; and how these applications are influenced by social, economic and ethical factors [based on EES & BIO]	- discusses how psychological science has been used to meet needs and inform decision making, and some social, economic or ethical implications of these applications [based on EES & BIO]	- describes ways in which psychological science has been used in society to meet needs and identifies some implications of these applications [based on EES & BIO]	- identifies ways in which psychological science has been used in society to meet needs [based on EES & BIO]

Psychological Science inquiry skills

A	B	C	D	E
For the psychological contexts studied, the students:	*For the psychological contexts studied, the students:*	*For the psychological contexts studied, the students:*	*For the psychological contexts studied, the students:*	*For the psychological contexts studied, the students:*
- "designs, conducts and improves safe, ethical investigations that efficiently collect valid, reliable data in response to a complex question or problem" [EES & BIO]	- "designs, conducts and improves safe, ethical investigations that collect valid, reliable data in response to a question or problem" [EES & BIO]	- "designs and conducts safe, ethical investigations that collect valid data in response to a question or problem" [EES & BIO]	"plans and conducts safe, ethical investigations to collect data in response to a question or problem" [EES & BIO]	"follows a procedure to conduct safe, ethical investigations to collect data" [EES & BIO]
- "analyses data sets to explain causal and correlational relationships, the reliability of the data and sources of error" [EES & BIO]	- "analyses data sets to identify causal and correlational relationships, anomalies and sources of error" [EES & BIO]	- "analyses data to identify relationships, anomalies and sources of error" [EES & BIO]	- "analyses data to identify trends and anomalies" [EES & BIO]	"identifies trends in data" [EES & BIO]
For the	*For the*	*For the*	*For the*	*For the*

psychological contexts studied, the students:	*psychological contexts studied, the students:*	*psychological contexts studied, the students:*	*psychological contexts studied, the students:*	*psychological contexts studied, the students:*
- "justifies their selection of data as evidence, analyses evidence with reference to models and/or theories and develops evidence-based conclusions that identify limitations" [EES & BIO]	- "selects appropriate data as evidence, interprets evidence with reference to models and/or theories and provides evidence for conclusions" [EES & BIO]	- selects data to demonstrate relationships linked to psychological knowledge and provides conclusions based on data [based on EES & BIO]	- "selects data to demonstrate trends and presents simple conclusions based on data" [EES & BIO]	- "selects data to demonstrate trends" [EES & BIO]
- "evaluates processes and claims; provides an evidence-based critique and discussion of improvements or alternatives" [EES & BIO]	- "evaluates processes and claims; provides a critique with reference to evidence and identifies possible improvements or alternatives" [EES & BIO]	- "evaluates processes and claims and suggests improvements or alternatives" [EES & BIO]	- "considers processes and claims from a personal perspective" [EES & BIO]	- "considers claims from a personal perspective" [EES & BIO]
- "selects, constructs and uses appropriate representations to describe complex relationships and solve complex and unfamiliar problems" [EES & BIO]	- "selects, constructs and uses appropriate representations to describe complex relationships and solve unfamiliar problems" [EES & BIO]	- "selects, constructs and uses appropriate representations to describe relationships and solve problems" [EES & BIO]	- "constructs and uses simple representations to describe relationships and solve simple problems" [EES & BIO]	-"constructs and uses simple representations to describe phenomena" [EES & BIO]
- "communicates effectively and accurately in a range of modes, styles and genres for specific audiences and purposes" [EES & BIO]	- "communicates clearly and accurately in a range of modes, styles and genres for specific audiences and purposes" [EES & BIO]	"communicates clearly in a range of modes, styles and genres for specific Purposes" [EES & BIO]	"communicates in a range of modes and genres" [EES & BIO]	- "communicates in a range of modes" [EES & BIO]

Psychological Science

Unit 3: Sensing, feeling, thinking and behaving

Unit Description

The human brain is a sophisticated information processing tool which uses an array of mental processes to understand the world, to function and to grow. From its foundation, psychological science has employed empirical investigations of these processes as the key to understanding human agency and interaction.

Perception is a multi-faceted process involving sensory experience and perceptual activity. In this unit, students investigate *sensation*: the physiological process of detecting stimuli via our senses, and *perception*: the process of reduction and organisation of constantly incoming stimuli into relevant comprehensible data. Students will link their observations to bottom-up and top-down explanatory models of information processing in the context of the principles of perceptual organisation. Students investigate and analyse how experiences and expectations influence perception, as well as the effect of psychological factors that influence perceptual set.

Emotion has both an unconscious automatic component as well as a cognitive aspect. Students will identify the biological basis of environmental influences on the expression and experience of emotion. They will be able to explain and analyse the biological and cognitive components that influence emotions, in both positive and negative ways.

Cognitive psychology considers ways in which the brain selects, organises and interprets the information it gathers and renders it into meaningful form. It involves two core processes--attention and memory. Attention is the ability to focus on incoming stimuli while memory represents the process by which these stimuli can be encoded and stored for later retrieval. Students will explore different theories of how memory works. They will learn how to apply the principles of different memory models to use and improve their own memory.

Students use behavioural science inquiry skills to design and conduct investigations into how different factors affect thinking and mental abilities; they construct and use models to analyse the data gathered; and they continue to develop their skills in constructing plausible predictions and valid, reliable conclusions.

Learning Outcomes

By the end of this unit, students:

- understand the processes and mechanisms of the physiological experience of sensation, and the organisation and interpretation of these sensations into the resulting perceptual experience
- understand and evaluate socio-cultural and psychological factors and their influence on perception
- understand and evaluate socio-cultural and psychological factors and their influence on emotion
- understand and evaluate the principles of attention and memory
- apply the principles of attention and memory to improving mental abilities in everyday situations
- develop and apply psychological investigative skills to design, conduct, evaluate, and communicate investigations into sensation, perception, emotion, and cognition
- communicate psychological understanding using qualitative and quantitative representations in appropriate modes and genres.

Content Descriptions

Science Inquiry Skills (Psychological Science Unit 3)

Using theoretically based evidence, identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes. (ACSPS069**)**

Design investigations including the procedure/s to be followed, the information required and the type and amount of primary and/or secondary data to be collected; conduct risk assessments; and consider research ethics. (ACSPS070)

Conduct investigations safely, competently and methodically for the collection of valid and reliable data. (ACSPS071)

Represent data in meaningful and useful ways; organise and analyse data to identify trends, patterns and relationships; discuss the ways in which measurement error and instrumental accuracy and the nature of the procedure and sample size may influence uncertainty and limitations in data; and select, synthesise, and use evidence to make and justify conclusions. (ACSPS072)

Interpret a range of scientific and media texts and evaluate processes, claims, and conclusions by considering the quality of available evidence, including interpreting confidence intervals in secondary data; use reasoning to construct scientific arguments. (ACSPS073)

Select, construct and use appropriate representations to communicate conceptual understanding, solve problems, and make predictions. (ACSPS074)

Communicate to specific audiences and for specific purposes using appropriate language, genres and modes, including research reports. (ACSPS075)

Science as a Human Endeavour (Units 3 & 4)

ICT and other technologies have dramatically increased the size, accuracy, and geographic and temporal scope of data sets with which scientists work. (ACSPS076)

Models and theories are contested and refined or replaced when new evidence challenges them or when a new model or theory has greater explanatory power. (ACSPS077)

The acceptance of scientific knowledge can be influenced by the social, economic and cultural context in which it is considered. (ACSPS078)

People can use scientific knowledge to inform the monitoring, assessment and evaluation of risk. (ACS)

Science can be limited in its ability to provide definitive answers to public debate; there may be insufficient reliable data available or interpretation of the data may be open to question. (ACSPS078)

International collaboration is often required when investing in large-scale science projects or addressing international issues. (ACSPS080)

Science Understanding

Sensation and perception

Sensation and perception are the ways in which the brain selects, organises, and interprets the information arising from the world into a meaningful form. (ACSPS081)

The processes of sensation and perception reduce information processing load through the processes of attention, activation threshold, feature detection and sensory adaptation. (ACSPS082)

Selective attention involves the ability to screen out sensory information and to focus only on a limited aspect of the stimulus. This ability results in change blindness and helps to explain choices and preferences made by individuals with regard to the sensory input. (ACSPS083)

Concepts of threshold and adaptation help to explain the amount of information taken in as well as making predictions about the kind of information we detect based on our experience, expectation, motivation, and alertness. (ACSPS084)

Vision is the dominant sense in primates and its processes are an important aspect of how information about the environment is gathered. (ACSPS085)

Other sensory systems, such as the audition, olfaction, gustation, and somesthesis are also important in the study of sensation. The sense of pain and its biological, psychological, and sociocultural aspects have numerous applications in real life contexts. Disorders of sensory and perceptual systems also need to be taken into account. (ACSPS086)

The meaning we derive from information involves perceptual principles such as Gestalt, figure-ground, binocular and monocular depth cues, and perceptual constancies. These principles are often evident in perceptual illusions, and are investigated within cross-cultural, developmental and comparative contexts. (ACSPS087)

Perceptual set, as well as motivation, expectation, emotion and culture, are each able to affect perception. (ACSPS088)

Emotion

Human beings from different social contexts share the ability to experience a similar range of emotional states. Certain emotional cues such as facial expressions are universally recognised, however some emotional processing is unique to the cultural context. (ACSPS089)

Emotional states can be expressed differently depending on the personal and social context. This includes differences in body language and facial expressions, etiquette and propriety. (ACSPS090)

Emotional states have biological correlates and can be affected by various biological factors. The biopsychological and evolutionary theories of psychological science present different explanatory approaches to these phenomena. (ACSPS091)

How people experience emotion is subjective and depends on how they relate emotions to particular sociocultural cues. These cues can include depictions of emotions in the media and popular culture. (ACSPS092)

Motivation is the factor that energises or stimulates behaviour and has been described by a number of theories of motivation (for example Arousal theory, Maslow's hierarchy of needs, self-determination theory). (ACSPS093)

Biological (for example, primary and stimulus motives), psychological (for example reward and delayed gratification) and socio-cultural factors (for example, secondary motives related to acquired need for power, affiliation, approval, and achievement) can each affect motivation. (ACSPS094)

Disorders of emotional and motivational systems can have severe consequences for everyday living, but can be used in better understand underlying mechanisms. (ACSPS095)

Cognition

Separate systems are responsible for analysing an object's different visual features. Examination of the parallel processing of visual stimuli indicates that visual attention is both selective and serial. (ACSPS096)

Processing of auditory stimuli allows for selective listening as demonstrated by the cocktail party phenomenon. (ACSPS097)

Selective attention is the process by which the limited capacity of sensory processing can be directed to screen incoming information to allow focus on the most important input. This process is well demonstrated by the phenomenon of change blindness. (ACSPS098)

The Atkinson-Shiffrin modal model of memory divides memory into long-term, short-term and sensory components. (ACSPS099)

Memory consolidation takes places through a series of stages which begins with the sensory store, progresses to the short term store (sometimes referred to as working memory), and then is more permanently stored in long term memory. (ACSPS0100)

Long term memory features a number of different forms of memory store including the declarative memory store which is divided into episodic and semantic memory as well as implicit memory as represented by procedural memory. (ACSPS101)

Information is lost by either encoding failure, retrieval failure, or by proactive and retroactive interference effects. (ACSPS102)

The efficacy of memory is affected by a variety of mental processes including attention and conditioning, and also by social and environmental cues, and the nature of the stimulus itself. (ACSPS103)

Memory can be improved by the use of rehearsal and mnemonics. (ACSPS104)

Memory is fallible, and is subject to manipulation, such as by the use of hypnosis. False memories can also be induced. (ACSPS105)

The process of reconstructing memory can be problematic, particularly in situations involving eyewitness testimony. (ACSPS106)

Cultural factors affect imagery, concepts, and categories. (ACSPS107)

Disorders of cognitive, including memory, systems can have severe consequences for everyday living, but can be used in better understand underlying mechanisms. (ACSPS108)

Psychological Science

Unit 4: Neuroscience, Mental Health and Wellbeing

Unit Description

Behavioural neuroscience helps students develop an understanding of how the constant interplay between genetics and environment, both from an evolutionary perspective (phylogenetic) and a developmental perspective (ontogenetic), is apparent in determining brain-behaviour relationships.

Consciousness and arousal help to explain natural variations in behaviour as a result of circadian rhythms, and also to explain the mechanisms underlying the stress response. Dealing with stress and change is a key concept in mental health and well-being, where students explore factors that optimise psychological functioning, as well as those factors which influence the development of psychological disorders. In this unit, students investigate these topics using a range of methodologies from biological recording to psychological intervention.

Through the investigation of appropriate contexts, students explore the ways in which models and theories related to biological psychology, consciousness and arousal, and mental health and well-being have developed over time and through interactions with social, cultural, economic and ethical considerations. They investigate the ways in which science contributes to contemporary debate about local, regional, and international issues, including evaluation of risk and action for sustainability, and they recognise the limitations of science in providing definitive answers in different contexts.

Students use science inquiry skills to design and conduct investigations into how different factors affect brain-behaviour relationships, states of consciousness and arousal, and mental health and well-being; they construct and use models to analyse the data gathered; they continue to develop their skills in constructing plausible predictions and valid, reliable conclusions.

Learning Outcomes

By the end of this unit, students:

- understand how the nervous system has a bidirectional relationship with behaviour, where each is constantly influencing the other
- understand how different states of arousal and consciousness lead to a continuum of human experience from sleep to hyperarousal
- understand how scientific models and theories have developed and are applied to neuroscience, mental health and illness, and wellbeing
- use science inquiry skills to design, conduct and analyse ethical investigations into neuroscience, mental health and illness, and wellbeing
- evaluate, with reference to empirical evidence, claims about neuroscience, mental health and illness, and wellbeing
- communicate psychological understanding using qualitative and quantitative representations in appropriate modes and genres

Content Descriptions

Science Inquiry Skills (Psychological Science Unit 4)

Using theoretically based evidence, identify, research and construct questions for investigation, propose hypotheses and predict possible outcomes. (ACSPS109)

Design investigations including the procedure/s to be followed, the information required and the type and amount of primary and/or secondary data to be collected; conduct risk assessments; and consider research ethics, and animal (including human) ethics. (ACSPS110)

Conduct investigations safely, competently, and methodically for the collection of valid and reliable data. (ACSPS111)

Represent data in meaningful and useful ways; organise and analyse data to identify trends, patterns and relationships; discuss the ways in which measurement error and instrumental accuracy, the nature of the procedure and sample size may influence uncertainty and limitations in data; and select, synthesise and use evidence to make and justify conclusions. (ACSPS112)

Interpret a range of scientific and media texts and evaluate processes, claims and conclusions by considering the quality of available evidence, including interpreting confidence intervals in secondary data; use reasoning to construct scientific arguments. (ACSPS113)

Select, construct and use appropriate representations to communicate conceptual understanding, make predictions and solve problems. (ACSPS114)

Communicate to specific audiences and for specific purposes using appropriate language, genres and modes, including research reports. (ACSPS115)

Science as a Human Endeavour (Units 3 & 4)

ICT and other technologies have dramatically increased the size, accuracy and geographic and temporal scope of data sets with which scientists work. (ACSPS116)

Models and theories are contested and refined or replaced when new evidence challenges them, or when a new model or theory has greater explanatory power. (ACSPS117)

The acceptance of scientific knowledge can be influenced by the social, economic and cultural context in which it is considered. (ACSPS118)

People can use scientific knowledge to inform the monitoring, assessment, and evaluation of risk. (ACSPS119)

Science can be limited in its ability to provide definitive answers to public debate; there may be insufficient reliable data available, or interpretation of the data may be open to question. (ACSPS120)

International collaboration is often required when investing in large-scale science projects or addressing international issues. (ACSPS121)

Science Understanding

Behavioural neuroscience

The nervous systems can be divided into the central nervous system (the brain and spinal cord) and the peripheral nervous system. (ACSPS122)

The basic building block of the nervous system is the neuron which is comprised of a number of components (i.e., dendrites, cell body, axon, synapse) which are crucial to its role in neurotransmission. (ACSPS123)

Neural messages occur within and between neurons (action potentials and function of neurotransmitters at the synaptic gap); many drug effects can be explained in terms of their effects upon synaptic transmission. (ACSPS124)

The brain can be divided into a number of discrete areas which subserve different basic information processing and adaptive functions. (ACSPS125)

The hemispheres are not mirror images of each other, and each hemisphere is specialised in its function. (ACSPS126)

Methods of revealing brain-behaviour relationships include examining the effects of brain impairment (e.g., the split brain preparation, unilateral spatial neglect, aphasic syndromes and mild and major neurocognitive disorder), neural cell recording, neuroimaging techniques (e.g., CT, MRI, TMS, fMRI and PET), and examining ontogenetic and phylogenetic development and in particular the constant interplay between genetics and environment. (ACSPS127)

Psychobiological interventions include environmental enrichment for general optimisation of brain-behaviour relationships, and medication or neural grafting for neurodegenerative disease and brain injury. (ACSPS128)

Sleep and altered states of consciousness

Levels of arousal are constantly changing and lie on a continuum from sleep through to hyperarousal. (ACSPS129)

Levels of arousal affect performance on tasks (e.g., Yerkes-Dodson Law). (ACSPS130)

The chronic arousal associated with stress has detrimental health effects (e.g., General Adaptation Syndrome; damage to hippocampus arising from chronic stress). (ACSPS131)

Abnormal states of consciousness can be induced by drugs or can be a symptom of mental disorders. (ACSPS132)

Sleep is regulated by homeostasis and circadian rhythms. (ACSPS133)

Sleep involves five stages, each of which has unique features. (ACSPS134)

Several theories have been put forward to explain the phenomenon of dreaming. (ACSPS135)

Sleep can be investigated with a variety of techniques including polysomnography, sleep diaries and measurements of speed and accuracy on cognitive tasks. (ACSPS136)

Sleep deprivation affects physical and psychological functioning. (ACSPS137)

Sleep patterns differ across the lifespan. (ACSPS138)

There are a number of common sleep disorders including insomnia, sleep apnoea, restless legs syndrome and narcolepsy. (ACSPS139)

Sleep disorders can be treated with interventions (e.g., bright light therapy, stimulus control therapy and sleep restriction therapy). (ACSPS140)

Mental health and well-being

Although concepts of mental health are to a certain extent defined by culturally-specific social norms, there are similaries in the manifestations of psychological disorders across cultures. (ACSPS141)

Mental illness can be distinguished by thoughts, emotions, and behaviours which are maladaptive and lead to increases in personal suffering. (ACSPS142)

The main categories of psychological disorders include psychotic disorders (e.g., schizophrenia), mood disorders (e.g., depression), anxiety disorders (e.g., phobias) and personality disorders (e.g., borderline or antisocial personality disorder). (ACSPS143)

Evidence-based treatments for psychological disorders include combinations of medication-based, cognitive and behavioural approaches. (ACSPS144)

Within a health-promotion framework, there are different theoretical approaches to understanding well-being (e.g., positive psychology's PERMA example), which then inform evidence-based approaches to improved functioning at the individual, organisational, and societal levels. (ACSPS145)

Resilience consists of a combination of internal and external assets which assist individuals to cope with change and challenge. (ACSPS146)

Effective coping strategies contribute to the resilience of the individual in times of adversity. (ACSPS147)

Achievement Statements: Units 3 and 4

Psychological Science concepts, models and applications (based on ACARA EES, 2014, pp.33-34, and ACARA BIO, 2013, pp.38-39)

A	B	C	D	E
For the psychological systems or phenomena studied, the student:	*For the psychological systems or phenomena studied, the student:*	*For the psychological systems or phenomena studied, the student:*	*For the psychological systems or phenomena studied, the student:*	*For the psychological systems or phenomena studied, the student:*
- analyses how system components function and are interrelated across a range of investigative levels (e.g., biological, psychological, sociocultural) to enable continuity of functioning at the individual, group and societal levels.	- explains how system components are interrelated to enable continuity of functioning at the individual, group and societal levels.	- describes how system components are interrelated and enable continuity of functioning at the individual, group and societal levels.	- identifies system components that contribute to the functioning at the individual, group and societal levels	- - identifies some parts of the system that contribute to functioning at the individual, group and societal levels
- "explains the theories and model/s used to explain the systems, the supporting evidence and their limitations and assumptions" [BIO & ESS]	- "describes the theories and model/s used to explain the systems, some supporting evidence, and their limitations" [BIO & EES]	- "describes key aspects of a theory or model used to explain system processes and the phenomena to which they can be applied" [BIO & ESS]	- "describes key aspects of a theory or model used to explain a system process" [BIO & EES]	- "identifies aspects of a theory or model related to system process" [BIO & EES]
- "applies theories and models of systems and processes to explain phenomena and critically analyse complex problems and make reasoned, plausible predictions in unfamiliar contexts" [BIO & EES]	- "applies theories and models of systems and processes to explain phenomena, analyse problems and make plausible predictions in unfamiliar contexts" (BIO & EES)	- "applies theories or models of systems and processes to explain phenomena, interpret problems and make plausible predictions in some unfamiliar contexts" (BIO & EES)	- "describes phenomena, interprets simple problems and makes simple predictions in familiar contexts " (BIO & ESS)	- "describes phenomena and makes simple predictions in familiar contexts " (BIO & ESS)
- evaluates the utility of the concept of psychological literacy in terms of optimizing functioning at the individual, group, organizational and global levels.	- explains the utility of the concept of psychological literacy in terms of optimizing functioning at the individual, group, organizational and global levels.	- describes the utility of the concept of psychological literacy in terms of optimizing functioning at the individual, group, organizational and global levels.	- identifies key aspects of how the concept of psychological literacy is relevant to optimizing functioning at the individual, group, organizational and global levels.	- identifies some aspects of how the concept of psychological literacy is relevant to optimizing functioning.

For the psychological contexts studied, the students:	*For the psychological contexts studied, the students:*	*For the psychological contexts studied, the students:*	*For the psychological contexts studied, the students:*	*For the psychological contexts studied, the students:*
- analyses the role of collaboration, debate and review, and technologies, in the development of psychological theories and models [based on EES & BIO]	- explains the role of collaboration, debate and review, and technologies, in the development of psychological theories and models [based on EES & BIO]	- describes the role of collaboration and review, and technologies, in the development of psychological theories or models [based on EES & BIO]	- describes the role of communication and new evidence in developing psychological knowledge [based on EES & BIO]	- identifies that psychological knowledge has changed over time [based on EES & BIO]
- evaluates how psychological science has been used in concert with other sciences to meet diverse needs and inform decision making; and how these applications are influenced by interacting social, economic and ethical factors [based on EES & BIO]	- explains how psychological has been used to meet diverse needs and inform decision making; and how these applications are influenced by social, economic and ethical factors [based on EES & BIO]	- discusses how psychological science has been used to meet needs and inform decision making, and some social, economic or ethical implications of these applications [based on EES & BIO]	- describes ways in which psychological science has been used in society to meet needs and identifies some implications of these applications [based on EES & BIO]	- identifies ways in which psychological science has been used in society to meet needs [based on EES & BIO]

Psychological Science inquiry skills

A	B	C	D	E
For the psychological contexts studied, the students:	*For the psychological contexts studied, the students:*	*For the psychological contexts studied, the students:*	*For the psychological contexts studied, the students:*	*For the psychological contexts studied, the students:*
- "designs, conducts and improves safe, ethical investigations that efficiently collect valid, reliable data in response to a complex question or problem" [EES & BIO]	- "designs, conducts and improves safe, ethical investigations that collect valid, reliable data in response to a question or problem" [EES & BIO]	- "designs and conducts safe, ethical investigations that collect valid data in response to a question or problem" [EES & BIO]	"plans and conducts safe, ethical investigations to collect data in response to a question or problem" [EES & BIO]	"follows a procedure to conduct safe, ethical investigations to collect data" [EES & BIO]
- "analyses data sets to explain causal and correlational relationships, the reliability of the data and sources of error" [EES & BIO]	- "analyses data sets to identify causal and correlational relationships, anomalies and sources of error" [EES & BIO]	- "analyses data to identify relationships, anomalies and sources of error" [EES & BIO]	- "analyses data to identify trends and anomalies" [EES & BIO]	"identifies trends in data" [EES & BIO]
For the	*For the*	*For the*	*For the*	*For the*

psychological contexts studied, the students:	*psychological contexts studied, the students:*	*psychological contexts studied, the students:*	*psychological contexts studied, the students:*	*psychological contexts studied, the students:*
- "justifies their selection of data as evidence, analyses evidence with reference to models and/or theories and develops evidence-based conclusions that identify limitations" [EES & BIO]	- "selects appropriate data as evidence, interprets evidence with reference to models and/or theories and provides evidence for conclusions" [EES & BIO]	- selects data to demonstrate relationships linked to psychological knowledge and provides conclusions based on data [based on EES & BIO]	- "selects data to demonstrate trends and presents simple conclusions based on data" [EES & BIO]	- "selects data to demonstrate trends" [EES & BIO]
- "evaluates processes and claims; provides an evidence-based critique and discussion of improvements or alternatives" [EES & BIO]	- "evaluates processes and claims; provides a critique with reference to evidence and identifies possible improvements or alternatives" [EES & BIO]	- "evaluates processes and claims and suggests improvements or alternatives" [EES & BIO]	- "considers processes and claims from a personal perspective" [EES & BIO]	- "considers claims from a personal perspective" [EES & BIO]
- "selects, constructs and uses appropriate representations to describe complex relationships and solve complex and unfamiliar problems" selects, constructs and uses appropriate representations to describe complex relationships and solve complex and unfamiliar problems [EES & BIO]	- "selects, constructs and uses appropriate representations to describe complex relationships and solve unfamiliar problems" [EES & BIO]	- "selects, constructs and uses appropriate representations to describe relationships and solve problems" [EES & BIO]	- "constructs and uses simple representations to describe relationships and solve simple problems" [EES & BIO]	-"constructs and uses simple representations to describe phenomena" [EES & BIO]
- "communicates effectively and accurately in a range of modes, styles and genres for specific audiences and purposes" [EES & BIO]	- "communicates clearly and accurately in a range of modes, styles and genres for specific audiences and purposes" [EES & BIO]	"communicates clearly in a range of modes, styles and genres for specific Purposes" [EES & BIO]	"communicates in a range of modes and genres" [EES & BIO]	- "communicates in a range of modes" [EES & BIO]