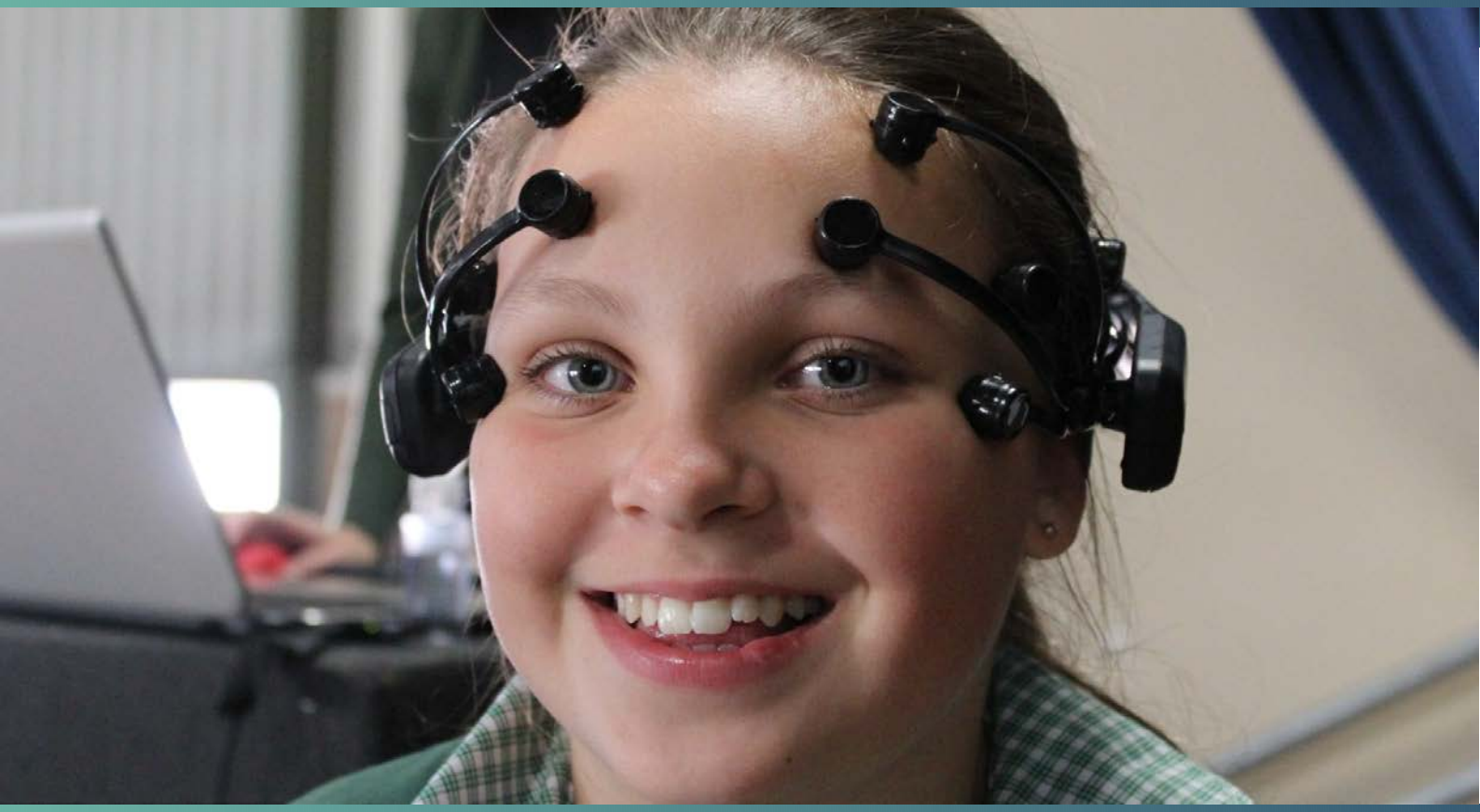
Mindz Brainplay Incursion for Students

Foundation for Educational Digital Development



Bring STEM to your class with this exciting and innovative incursion. Designed for students from years five through twelve, Mindz Brainplay is fully aligned to the Australian curriculum.

Partnering with Mindz Brainplay, our presenter will deliver a highly interactive and engaging seminar to your students. Using safe technology, Mindz Brainplay reads and explains the electrical signals emitted from your student's brains using a variety of EEG (electroencephalograph) headsets. These brainwave signals are generated by the 80-100 billion neurons inside your head.

As well as actually seeing your neurons firing, your students can use the power of differing thoughts to control objects on a screen. They can even play games against friends using only the mind to move the gaming characters. It's a completely safe, educational and fascinating journey into the brain, brain health, neuron communication and the possible future of a brain-controlled world.

Mindz Brainplay takes neuroscience out of the lab and onto the streets. It's educational, entertaining and gives a fascinating insight the workings of the mind.

Recommended session times

Years 5 and 6: 50 - 60 minute session (+ 'Mind Control' session if desired)

Years 7 – 10: 60 – 75 minute session

Years 11 – 12: 75 – 90 minute session

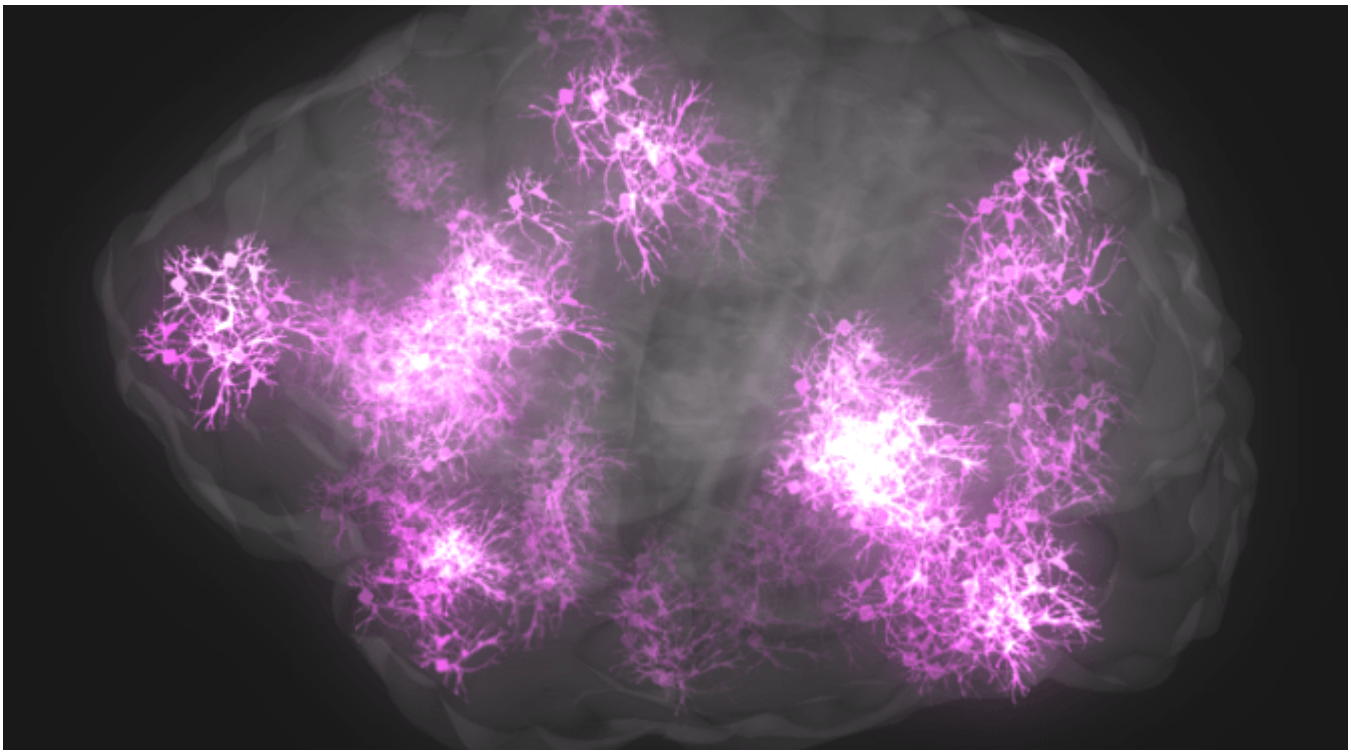
Format

Small or large group presentation depending on school needs. Mindz Brainplay can present to a small group (<8) where every student will get a 'turn' or to larger group where several students show what is possible.

For all groups we need to connect to a large screen or data projector. For large areas, a sound system is needed. We can supply a data projector and sound system if necessary at no extra cost.

For years 5 and 6 we've found that while we get 5-6 students to demonstrate, nearly **EVERY** student in a class wants to have the experience. We can provide an extra **'Mind Control'** session to give up to 20 additional students the chance to see their brain activity or practice mind control.

For years 7-12 we've found that groups of students are happy to watch 5-6 'demonstrators' show what is possible using the EEG headsets. A 60-90-minute session is usually fine.



Session outlines

Years 5 and 6

Science / STEM

Time: 50-60 minutes **Group size:** Unlimited yet <30 preferred **Number of students actively involved:** 5

Extra time for whole class involvement available at extra cost (up to 25 students).

1. Introduction: What's in our head? Brain structure including different lobes and function
2. Structure of a neuron and brain waves introduced. Brain Health discussed
3. Demonstration of one type of 'brain reader' using one student and an exercise in producing 'Theta' waves (1 x student)
4. An introduction to the next type of brain reader and explanation of the concept of EEG (1 x student)

- Look at the use of this in medicine/science. Disability aids
- Move objects on screen with their mind
- Full colour moving image of their brain shown
- Zoom in on neurons

5. Another student to do the same yet with the addition of a thought-controlled game (1 x student)
6. Another student to play the game (1 x student)
7. Selection of a 2nd student to play in a best of 3 thought contest (1 x student)
8. Round-up of the session, other future uses and quick quiz

Years 7 - 10

Science / STEM

Time: 60-75 minutes **Group size:** Unlimited yet <30 preferred **Number of students actively involved:** 6

1. Introduction: What's in our head? Brain structure including different lobes and function
2. Structure of a neuron, explanation of electrochemical system and brain waves introduced. Brain Health discussed
   - Alcohol & drug effects
   - Sport concussion rules
3. Demonstration of MindWave EEG using one student producing 'Theta' waves (1 x student)
4. The Emotiv 14 sensor. How it was developed and the story of Tan Le. Movement of prosthetics/wheelchairs (1 x student)
   - Moving objects on screen with their mind
   - Full colour moving image of their neurons shown to group.
   - Zoom in on individual neurons / axons
5. Another student with addition of a thought-controlled game (1 x student)
6. Another student to play the game (1 x student)

7. Selection of a 2nd student to play in a best of 3 thought contest (2 x student)
8. **Careers in STEM. Future EEG use.** Round-up of the session and explanation of Socrative quiz

Years 11 and 12

Biology/Human Biology

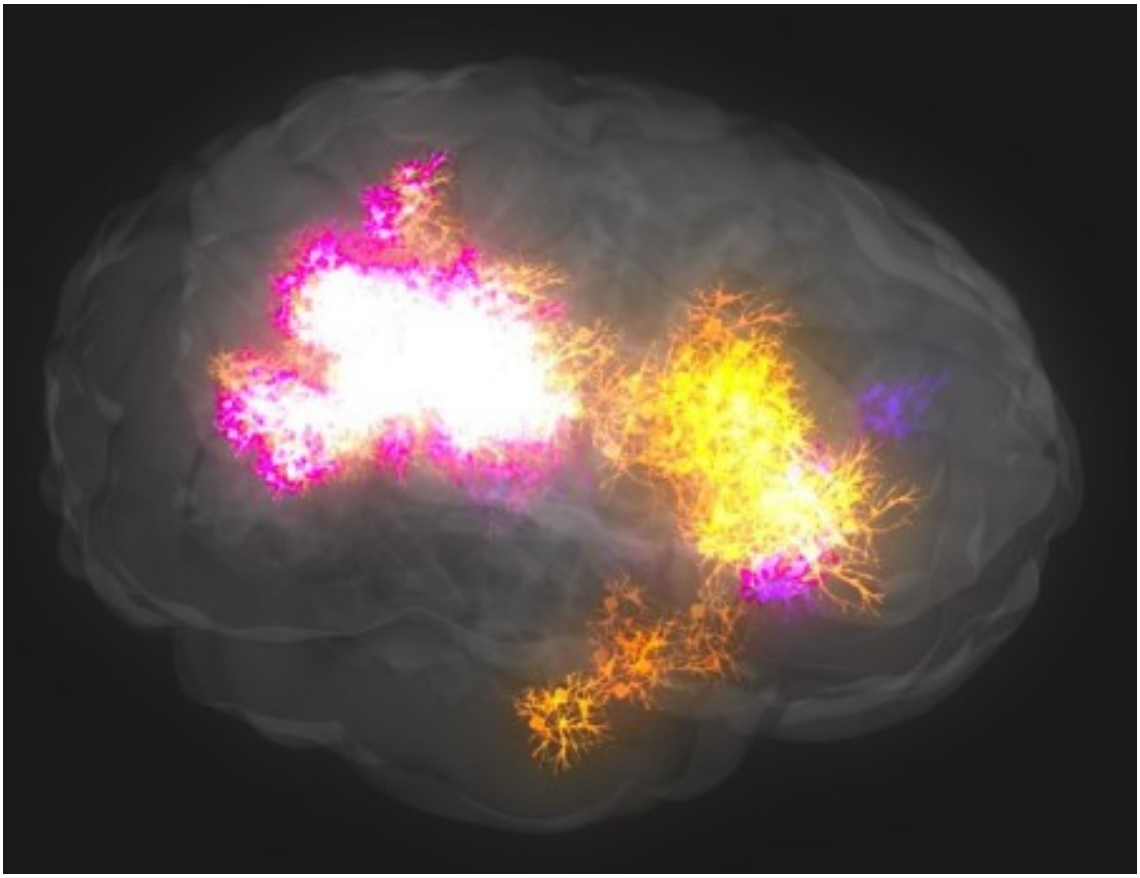
Year 11: From Single Cell to Multi Cellular organisms/ The Functioning Human Body

Year 12: Surviving in a changing environment/Homeostasis and Disease

Time: 75-90 minutes **Group size:** Unlimited yet <30 preferred **Number of students actively involved:** 5

1. Introduction: What's in our head? Brain structure including different lobes and function
2. Structure of a neuron and function of a neuron, including action potential. Electrochemical system explained.
3. Neurotransmitters introduced. Brain waves introduced.
    - **In depth:** Description of action potentials and ion exchange in neurons

      OR
    - **In depth:** Description of the different parts of the nervous system
4. Demo of MindWave EEG for 'Theta' waves. **Theta & their importance in exams explained. (1 x student)**
5. Introduction to the Emotiv 14 sensor and explanation of the concept.
6. (1 x student)
7. Moving objects on screen with their mind
8. Full colour moving image of their neurons shown to group. Axons identified
9. Selection of a student to do same with the addition of a thought-controlled game (1 x student)
10. Another student to play the game (1 x student)
11. Selection of a 2nd student to play in a best of 3 thought control contests. (1 x student)
12. **Careers in Science.** Round-up of the session and explanation of Socrative quiz.



Years 11 and 12

Integrated Science

Year 11: General Interest/STEM

Year 12: Energy

Time: 75-90 minutes **Group size:** Unlimited yet <30 preferred **Number of students actively involved:** 5

1. Introduction: What's in our head? Brain structure including different lobes and function
2. Structure of a neuron and function of a neuron, including action potential. Electrochemical system explained. Neurotransmitters introduced. Brain waves introduced.
    - **In depth:** Description of neurotransmitters, method of action of common drugs of abuse and effect on your brain.
3. Demo of MindWave EEG for 'Theta' waves. **Theta & their importance in exams explained.** (1 x student)
4. Introduction to the Emotiv 14 sensor and explanation of the concept. (1 x student)
    - Moving objects on screen with their mind
    - Full colour moving image of their neurons shown to group. Axons identified
5. Selection of a student to do same with the addition of a thought-controlled game (1 x student)
6. Another student to play the game (1 x student)
7. Selection of a 2nd student to play in a best of 3 thought control contests. (1 x student)
8. **Careers in Science.** Round-up of the session and explanation of Socrative quiz.

Years 11 and 12

Psychology

Years 11 and 12: Biological Influences & Bases of behaviour/Cognition

Time: 75-90 minutes **Group size:** Unlimited yet <30 preferred **Number of students actively involved:** 5

1. Introduction: What's in our head? Brain structure including different lobes and function
2. Structure of a neuron and function of a neuron, including action potential. Electrochemical system explained. Neurotransmitters introduced. Brain waves introduced.
    - **In depth:** How EEG functions and brief history of EEG science.
3. Demo of MindWave EEG for 'Theta' waves. **Theta & their importance in exams explained.** (1 x student)
4. Introduction to the Emotiv 14 sensor and explanation of the concept. (1 x student)
    - Moving objects on screen with their mind
    - Full colour moving image of their neurons shown to group. Axons identified
5. Selection of a student to do same with the addition of a thought-controlled game (1 x student)
6. Another student to play the game (1 x student)
7. Selection of a 2nd student to play in a best of 3 thought control contests. (1 x student)
8. **Careers in Science.** Round-up of the session and explanation of Socrative quiz.

WA Curriculum (Years 5-10)

Years 5 and 6	Year 7	Year 8	Year 9	Year 10
Use evidence to explain events and phenomena (ACSHE081, ACSHE098)	Scientific knowledge is refined as new evidence becomes available (ACSHE119)	Cells are the basic units of living things; they have specialised structures and functions (ACSSU149)	Multi-cellular organisms rely on coordinated and interdependent internal systems (ACSSU175)	Scientific understanding is contestable and is refined over time (ACSHE191)
Pose clarifying questions and make predictions about scientific investigations (ACSIS231, ACSIS232)	Science knowledge can develop through collaboration across the disciplines of science (ACSHE223)	Multi-cellular organisms contain systems of organs carrying out specialised functions that enable them to survive and reproduce (ACSSU150)	Energy transfer through different mediums can be explained using wave and particle models (ACSSU182)	Advances in scientific understanding often rely on technological advances and are often linked to scientific discoveries (ACSHE192)
Describe observations, patterns or relationships in data using digital technologies (ACSIS090, ACSIS107)	Solutions to contemporary issues may impact on other areas of society (ACSHE120)	Scientific knowledge is refined as new evidence becomes available (ACSHE134)	Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries (ACSHE158)	People use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect people's lives (ACSHE194)
		Communicate ideas, findings and evidence using scientific language (ACSIS148)		
	People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity (ACSHE121)	People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity (ACSHE136)	People use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect people's lives (ACSHE160)	Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately (ACSIS200)
	Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge (ACSIS124)	Solutions to contemporary issues may impact on other areas of society (ACSHE135)	Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately (ACSIS166)	Communicate scientific ideas and information, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (ACSIS208)
		Describe observations, patterns or relationships in data using digital technologies (ACSIS144)		
	Describe observations, patterns or relationships in data using digital technologies (ACSIS129)	Science knowledge can develop through collaboration across the disciplines of science (ACSHE226)	Use knowledge of scientific concepts to draw conclusions that are consistent with evidence (ACSIS170)	
	Communicate ideas, findings and evidence using scientific language (ACSIS133)	Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge (ACSIS139)	Communicate scientific ideas including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (ACSIS174)	

WACE Courses (Years 11 and 12)

	Course			
	Biology	Human Biology	Integrated Science	Psychology
Science Enquiry Skills	The collection and analysis of data to provide evidence	Evaluate the impact of advancements in human biology on individuals and society Communicate understandings of human biology	Translate and analyse information to find patterns and draw conclusions	Interpret and evaluate findings in relation to ideas or hypotheses being tested
Science as a Human Endeavour	Explore the use and influence of science in society Assessment of science concepts, models and theories	Understand that knowledge of human biological systems has developed over time and continues to develop with improving technology Understand that knowledge of human biological systems has developed over time and continues to develop with improving technology	Understand the evolving nature of science Understand that scientific knowledge can be applied to solve problems	Systematic exploration into the complexities of human behaviour based on evidence gathered
Science Understanding	Use of scientific concepts, models and theories to explain and predict phenomena	Understand structure and function in the body	Understand interactions between components in living and physical systems Understand interactions between energy and matter	Understand factors relating to individuals, such as: cognition, or the way we think; biological bases of behaviour; and personality Understand psychology provides scientific explanations of behaviour with particular principles, procedures and approaches to data
Most relevant year 11 content	Unit 2: From cells to multicellular organisms	Unit 1: The functioning human body		Unit 1: Biological influence/Basis of Behaviour (Strong links)
Most relevant year 12 content	Unit 4: Surviving in a Changing environment	Unit 3: Homeostasis and Disease	Unit 4: Energy	Unit 3: Biological Influences/Bases of Behaviour (Strong links)

Facilitator: Ben Currell

Ben leads the Mindz Brainplay Western Australia team. He is a science communicator with a passion for innovative education and is the current chair of the 'Game Changer' School STEM Awards in WA.

He holds a Bachelor of Science Majoring in Nanotechnology and post graduate qualifications in Innovation and Entrepreneurship. He is also a past National Youth Science Forum presenter.

When not talking science, Ben is possibly performing in a band somewhere around Perth.

Cost

Session option	* Cost (ex-GST)
Single session (60-90 mins):	$305
Half-day (3 hours): We can present two standard sessions:	$470
Full-day (6+ hours): We can present four or five standard sessions:	$790
Extra 'Mind Control' session: Where students who didn't get to demonstrate in our main session get to use the EEG to see their brain activity and use mind control. Allow 10 students per 30 minutes. Added to single session or half day bookings.	30 minutes - $100 60 minutes - $180 90 minutes - $250
Mindz post-visit activity packs: We always give teachers a page of definitions and follow-up activities. However, we can also provide basic EEG headsets with matching experiments at extra cost. Please discuss this with us before our visit.	Basic pack with experiments: $150

* Plus travel and accommodation if outside the Perth Metropolitan area.

Book today

Find and book courses at www.fedd.org.au/events or call 1800 34 FEDD (1800 34 3333).

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