Mindz Brainplay

Fun Neuroscience
DET provider number 0100392629

Costs for schools & syllabus links NSW (as at January 1, 2019)

Recommended session times per group (depending on school timetables):

Years 5 and 6: 50-60-minute session (+ ***'Mind Control'*** session if desired)
Years 7-10: 60-75-minute session | **Years 11-12:** 60-90-minute session | **Years 11-12: Investigating Science / Working Scientifically / Infectious & Non-Infectious Disease:** 90 minutes minimum (see outline).

Format:

Small or large group presentation depending on school needs. Mindz 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.

For years 7-12 (stages 4, 5 and 6), we've found that groups of students are happy to watch 8-10 'demonstrators' show what is possible using the EEG headsets. A 60-90-minute session is usually fine.

For years 5/6 (stage 3), we've found that while we get 8-10 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. See costs below.

Costs

We operate on a flat fee basis and try to fit in with school needs. For regional schools (150km + from Sydney CBD) we do half or full day bookings only.

Single standard session (60-90 mins): Small/large group format: $305 + gst

Investigating Science / Working Scientifically Research sessions (90 + minutes): $480 + gst

Half-day (3 hours): We can present **two** standard sessions: $480 + gst

Full-day (6+ hours): We can present **four** standard sessions, **two** investigating Science/Working Scientifically research sessions or a mix: $790 + gst

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 only. 30 minutes $100, 60 minutes $180 + gst, 90 minutes $250 + gst

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.

Contact us at schools@mindz.net.au

Stage and Outcome points NSW

Stage 3 Outcomes: *Science incorp. Tech.*	Stage 4 Outcomes: *Working Scientifically*	Stage 5 Outcomes: *Working scientifically*	Stage 6 Outcomes *Investigating Science / Working Scientifically*
ST3-1VA: Shows interest and enthusiasm **ST3-3VA:** Informed attitudes on future use of tech **ST3-6PW:** Scientific understanding of electricity transfer **ST3-11DI-T** explains how digital systems represent data, connect together to form networks and transmit data **ST3-1WS-S** Plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate conclusions (***only with post-visit headset and activities).***	**SC4-1VA:** Appreciates science **SC4-2VA:** Finding solutions **SC4-8WS:** Creates plausible solutions **SC4-11PW**: Scientific Knowledge – energy transfer **SC4-15LW:** Biological evidence	**SC5-1VA:** Appreciates importance of science **SC5-11PW:** Scientific knowledge – energy transfer **SC5-14LW**: Interactions between components in biological systems (SC5-14LW)	**BIO 11/12-1, BIO 11/12-3, BIO12-5, BIO 11/12-6BIO12-7, INS 11/12-2, INS 11/12-3. INS 11/12-5, INS 11/12-6, INS 11/12-7** ***This Working Scientifically research session differs from the Investigating Science session in that students need to DESIGN their investigation using supplied stimuli.***
	Stages 4 and 5 Outcomes *Life skills*		**Stage 6 Outcomes** *Biology - infectious/non infectious*
	SCLS-1VA: Recognises role of science **SCLS-2VA:** Working scientifically increases understanding **SCLS-19LW:** Science and tech has improved human health		**BIO 12-14:** Analyses infectious disease in terms of cause, transmission, m'ment & organism's response, **BIO 12-15**: Explains non-infectious disease & disorders & a range of technologies & methods used to assist, control, prevent & treat.

Stage 6 Outcomes

Investigating Science – Fact or Fallacy

INS 11/12-1: Develops and evaluates questions and hypotheses for scientific investigation
INS 11/12-3: Conducts investigations to collect valid/reliable primary and secondary data & info.
INS 11/12-5: Analyses and evaluates primary and secondary data and information
INS 11/12-7: Communicates scientific u'standing with suitable language etc for a specific audience etc
INS 11-8: Identifies that the collection of primary and secondary data initiates scientific investigations
INS 11-9: Examines the use of inferences and generalisations in scientific investigations
INS 12-12: Develops and evaluates the process of undertaking scientific investigations
INS 12-13: Describes and explains how science drives the development of technologies
INS 12-14: Uses evidence-based analysis in a scientific investigation to support or refute a hypothesis

Stage 3 Science / STEM Session outline

(grades 5 & 6)

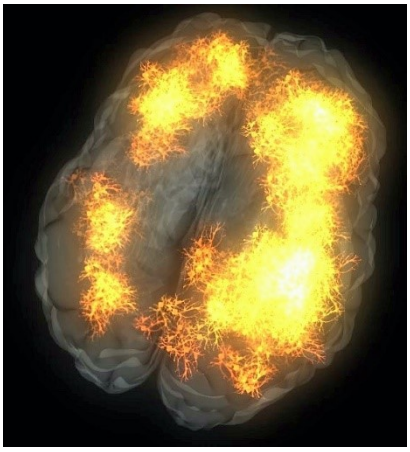
Time: 60 minutes

Group size: 10+

Number of students using EEGs: 10

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

1. Introduction: What's in our head? Brain health
2. Short video with stoppages to explain concepts. Treading on a Lego block used to explain signal travel via neurons. **Brain health discussed** and brain waves introduced.
3. Demo of the power of one neuron (3 x students)
4. Demonstration of one type of 'brain reader' and an exercise in producing 'Theta' waves. 3 x students
5. An introduction to the next type of brain reader (EEG) and explanation of the concept.
    - The **use of this in medicine/science. Disability aids.**
    - Student moves objects on screen with their mind 1 x student Full colour moving image of their brain shown.
    - Another student to do the same yet with the addition of a **thought-controlled game** 1 x student
    - Selection of 2 more students to play in a best of 3 thought contest. 2 x students
6. Time permitting: **Drone control** using the mind (one other step can be omitted to enable time for this).
7. Round-up of the session**, other future uses**.



For technology groups, less time is spent discussing neurons and more time spent on the technology needed to measure electrical activity.

Stage 4 & 5 Science / STEM Session outline

(grades 7-10 Science and Technology)

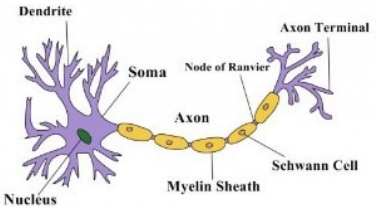
Time: 60 - 75 minutes **Group size:** Unlimited yet <30 preferred **Number of students actively involved:** 10

Time: 60-75 minutes
Group size: 10+
Number of students using EEGs: 10

1. Introduction: What's in our head? Neurons introduced
2. Short video to explain concepts. Treading on a Lego block used to explain pain response and flight or fight. Brain waves introduced.

■ Brain health and neuron communication ■ Alcohol & drug effects ■ Sport concussion rules

3. Demonstration of MindWave EEG producing 'Theta' waves. 3 x students
4. The Emotiv 14 sensor. How it was developed and the story of **Tan Le.**
    - Mind movement of image and the relevance to disability sector: 1 x student
    - Full colour moving image of neurons shown: 2 x students
    - Students do battle in game using their mind to control the characters: 4 students



5. **Flying a drone** using thought control.
6. Round-up of the session and explanation of Socrative quiz if chosen by teacher.

Stage 6 Biology

Infectious / non-infectious diseases of the brain

Time: 90 minutes
Number of students actively involved: 10
Group size: Unlimited yet <30 preferred

Time: 75-90 minutes
Group size: 10+
Number of students using EEGs: 10

1. Introduction: What's in our head?
2. Short video to explain concepts. The pain response and flight or fight. Brain waves introduced.

■ Overview of brain health ■ Alcohol and drug effects - foetal alcohol syndrome

■ **In depth: Infectious and non-infectious diseases that impact the brain. Causes, symptoms and current treatment. Brain EEG demonstration.**

→ Toxoplasmosis → Parkinson's → Epilepsy → Deep brain implants

3. Demo of MindWave EEG for 'Theta' waves. **Theta & their importance in exams explained.** 3 x students
4 **Explanation of how Theta waves can be increased. Importance to HSC.**
5. Introduction to the Emotiv 14 sensor and explanation of the concept Story of Tan Le.
    - movement of image and the relevance to disability sector: 1 x student
    - Full colour moving image of neurons shown: 2 x students
    - Students do battle in game using their mind to control the characters: 4 students
6. **Flying a drone** with mind control.
7. Careers in Science. Round-up of the session and explanation of Socrative quiz if chosen by teacher.

Stage 6 Working Scientifically

Session Type: Research – scientific method

Time: 90 minutes (minimum)
Group size: Maximum 25
Number of students using EEGs: 25
Our set-up time: 70 minutes
Total: Half a day: Cost $480 + gst

Number of students actively involved: Up to 25 (5 x groups)
Time: 90 minutes + 70 minutes set-up: Total time half day
Space needed: large area where up to 5 x groups of 5 students can work without distraction
Equipment required: 1 x laptop per group. We can provide 2 laptops for group use if needed.
What we provide: 1 x EEG per group, data recording sheets, 2 x laptops
Summary content: A 90-minute exploration using EEG headsets to work scientifically. The session is based around group work, not lecture and presentation. Students will **design** an investigation using provided equipment and stimuli. They will **collect, analyse and evaluate** their data following consistent criteria and using scientific method including controls. They will then communicate this to a specific audience.

Stage 6 Investigating Science

Session Type: Research – Fact or Fallacy

Time: 90 minutes (minimum)
Group size: Maximum 25
Number of students using EEGs: 25
Our set-up time: 70 minutes
Total: Half a day: Cost $480 + gst

Number of students actively involved: Up to 25 (5 x groups)
Time: 90 minutes + 70 minutes set-up: Total time half day
Space needed: large area where up to 5 x groups of 5 students can work without distraction
Equipment required: Data projector or large monitor, 1 x laptop per group.
What we provide: We provide EEG headsets, 2 x laptops, software, A3 answer sheets, & Socrative questions with results sent to the teacher.

What happens during a session?

1. **Introduction.** A brief 10-minute overview of the workings of the brain including the role of neurons and the different brainwaves created from levels of neuronal activity. (8 minutes)
2. **Technology.** EEG headset explained demonstrated with one student. Group divided into **'Research groups'** of 3 - 5 students. Their investigation task and terms explained. (12 minutes)
3. **Reference/Control Task:** Taking measurements of **a particular brainwave** from group in controlled manner. This involves observers, timekeepers, recorders and subjects where all students are involved. The results of this form a **'control'** for the group. (15 minutes)
4. **Fact or Fallacy.** Group then repeats the task outlined in **3** but with certain stimuli added **that represent commonly held beliefs about brainwaves.** The results are recorded for each student. (35-40 minutes). We provide the stimuli. Some examples include:
5. → That a physically horizontal position increases Theta waves.
6. → That heavy metal music decreases Theta waves and increases Gamma waves.
7. **Results / conclusion:** Students discuss the results with reference to **fact or fallacy.** They then make a conclusion about their research
8. **Science and Society**. Students create a 3-sentence summary of how the findings, technology or both can be used to make a difference in society. *(INDIVIDUAL SOCRATIVE 5-minutes).*