MACQUARIE University | Junior SCIENCE ACADEMY

Primary School Programs

Grades K-6

Explore STEM concepts through hands-on activities

Discover space, rockets, coding explosions, medicine and much more!

All programs align with the NSW Science and Technology syllabus

For details and bookings, contact jsaschools@mq.edu.au or submit an enquiry here:

About our incursions

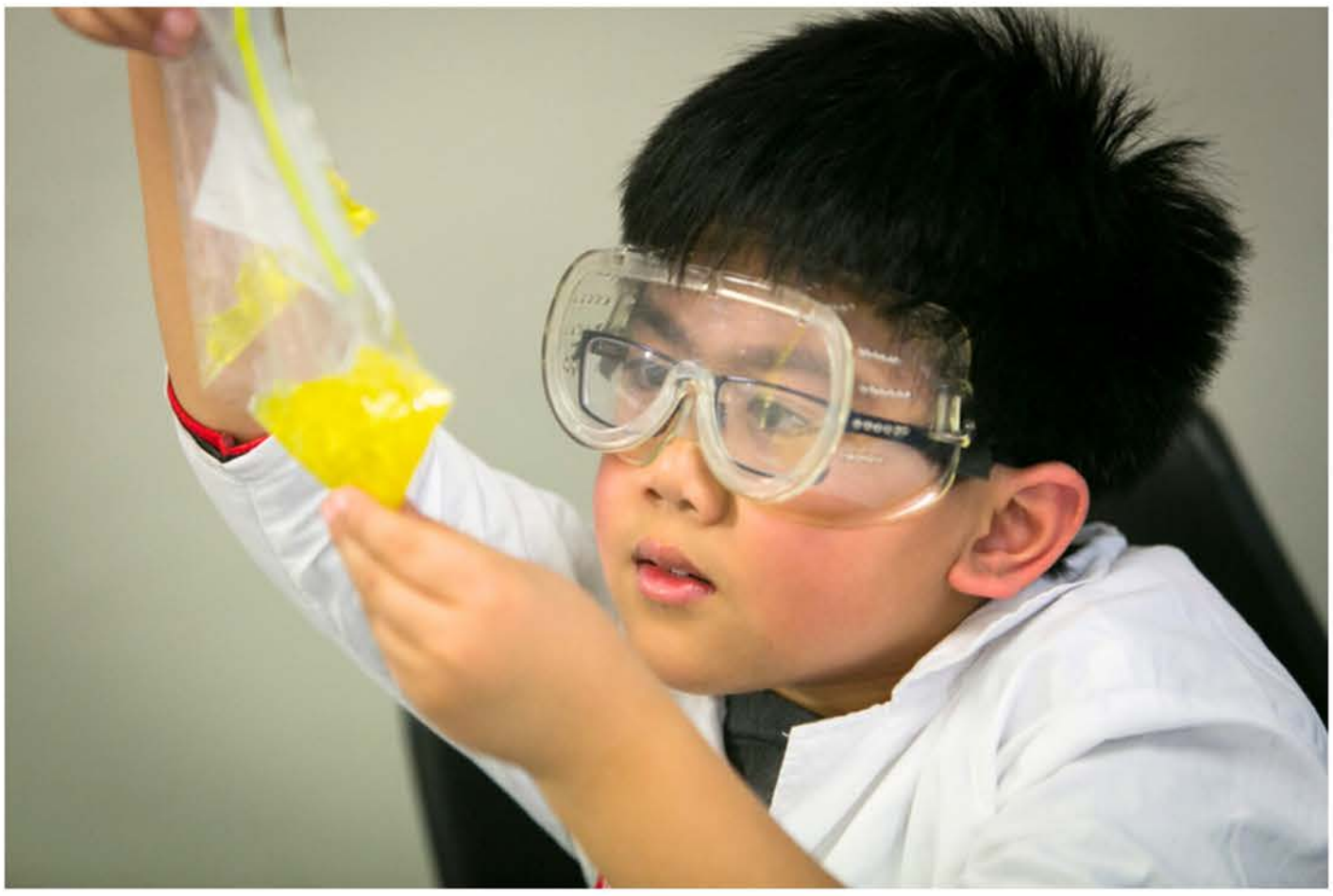
From coding to chemistry, from circuits to special effects, our wide range of programs has something to suit each stage and student! Each of our primary incursions is a full-day experience packed with hands-on investigations.

Junior Science Academy staff will bring our programs to your classroom, with expert educators and all equipment and resources provided.

Each program consists of three sessions, each running for approximately 90 minutes, that can be adapted to suit your school's timetable.

Due to the hands-on nature of our programs, we ask classroom teachers to support our staff during our sessions. No prior knowledge of the experiments or equipment is needed.

All programs are mapped to the NSW Science and Technology syllabus by stage to help you with your programming.



Accessibility

All courses are designed to engage the diverse range of students found in every classroom. If you have students or staff with specific accessibility needs, please discuss these with us and we will do our best to accommodate them. If needed, we can bring a Roger FM assisted listening device.

Cost

Our full-day programs have a fee of $30 per student, with a minimum class size of 25 students. Smaller groups can be booked, but may incur a higher cost per student.

Availability

Our incursions run on Mondays, Tuesdays and Wednesdays. We can run up to three classes simultaneously, for up to 30 students per class. For larger groups, please get in touch with us to discuss availability.

Our Incursions

The stages and years identified for each course are a guide. If you are interested in a course that is not identified for your class or group, please get in touch with us so that we can help you book the course that best suits you.

If there is a particular topic or focus area that you are interested in and is not covered by one of these courses, please contact us and we can discuss if or when a relevant course may be available.

For details and bookings, contact jsaschools@mq.edu.au
or submit an enquiry here:

K-1 SCRATCH JUNIOR

Students will discover the world of coding with the chance to code their own characters and stories.

If your school has iPads you are keen to utilise more, or has accessed the stem.T4L Coding Kit, this course will model for teachers how these resources can be used in the classroom.

This course includes:

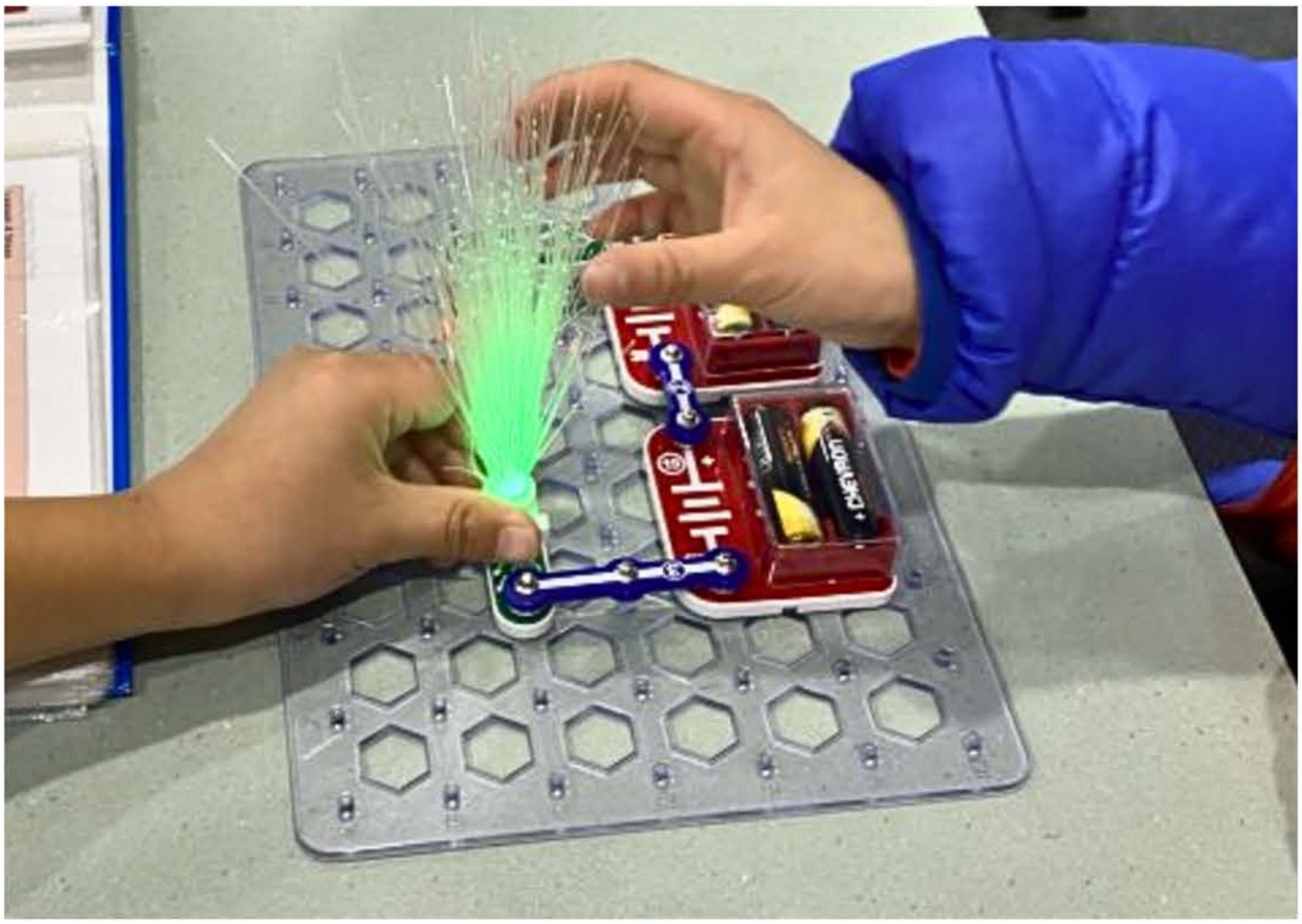
- An introduction to coding and Scratch Jr
- Adding and customising backgrounds, characters and actions
- Coding interactions between characters and creating stories

Syllabus Outcomes

Design & Production (ES1):
• follow a sequence of steps and decisions (algorithms) needed to solve problems
• order a sequence of steps and decisions (algorithms) needed to solve problems (ACTDIP004)

Digital Technologies (ES1):
• explore familiar digital devices, for example: (ACTDIK001) ComT SysT
- a computer
- a device to take a digital image
• follow and describe a sequence of steps (algorithms), for example: ComT DesT SysT
- following a procedure, e.g. getting dressed for school in the morning
- following a recipe, e.g. baking a cake
• design a process to solve an identified problem, for example: ComT SysT
- set of instructions to get from one point to another
- set of instructions to log on to a computer

1-2 TAKE CHARGE



Students will become electrical engineers for the day, and will build a range of circuits to explore electricity. They will create mazes, games and other designs to showcase their knowledge of electron flow and circuit-building.

This course includes:

- An introduction to snap circuit kits and building circuits with lights
- Adding fans and other devices to circuits
- Mastering series and parallel circuits
- Exploring resistance and designing mazes, games and other creations

Syllabus Outcomes

Design & Production (S1):
- identify technologies and appropriate materials needed to realise designed solutions (ACTDEP005)
- manipulate a range of materials for a purpose
- segment and sequence steps for making designed solutions
- collaborate to develop designed solutions

Physical World (S1):
- identify sound, light, heat, electricity and movement as forms of energy (ACSSU020)
- design and develop a product that uses one or more forms of energy to create change DesT SysT

2-3 SCRATCH ME IF YOU CAN

Students will learn the basics of coding and binary numbers with Scratch, and create their own computer game.

If your school has computers you are keen to utilise more, or has accessed the stem.T4L Coding Kit, this course will model for teachers how these resources can be used in the classroom.

This course includes:

- An introduction to coding and binary numbers
- Coding shapes and names
- Practicing coding by designing a computer game and other projects

Syllabus Outcomes

Design & Production (S2):
• develop a sequence of steps and decisions (algorithms) to solve a problem (ACTDIP010)
• generate visual programs using algorithms to create simple digital solutions

Digital Technologies (S2):
• identify and explore a range of digital systems and peripheral devices (ACTDIK007) ComT DesT SysT
• design and produce digital solutions using a visual programming language (ACTDIP011) ComT DesT

3-4 ZIPPY BALLOONS

Students will explore forces and chemical reactions using a range of household objects, from CDs, to straws, to balloons!

This course includes:

- Exploring air pressure with balloon races and marshmallow shooters
- Discovering the power of chemical reactions with bottle rockets
- Investigating friction by creating hovercrafts
- Tasting a chemical reaction with sherbet

Syllabus Outcomes

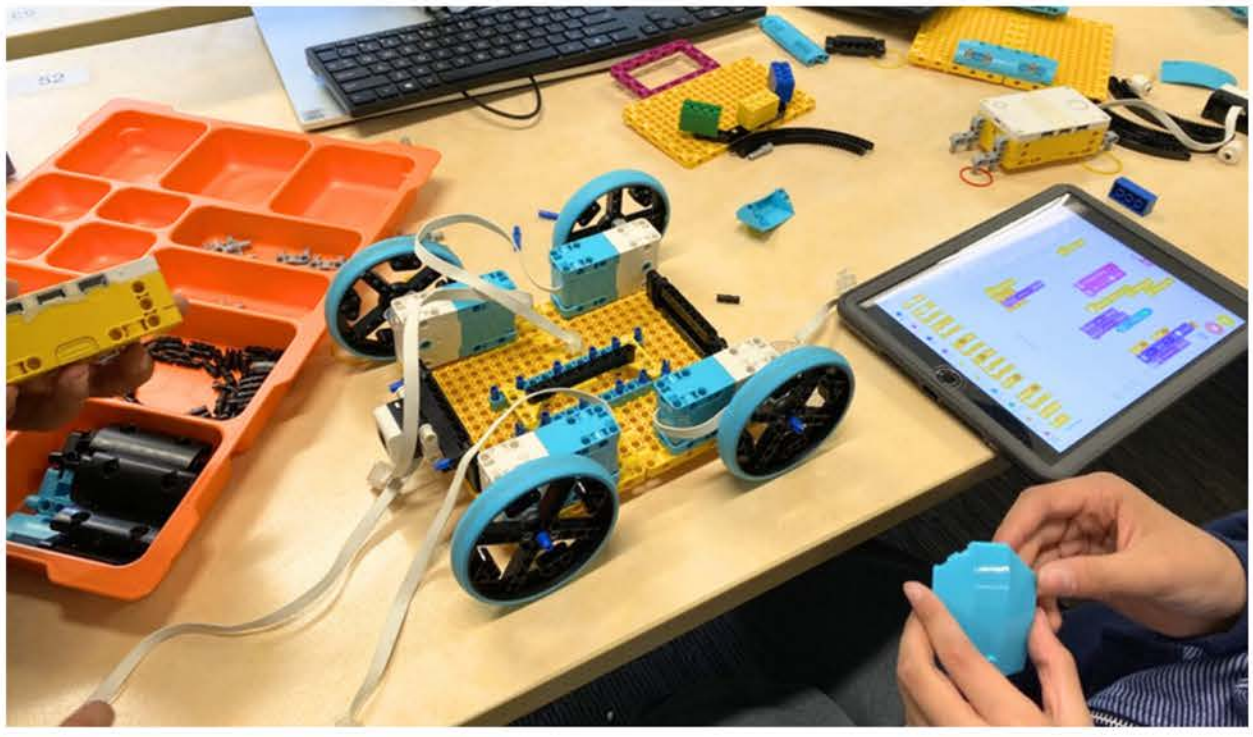
Working Scientifically (S2):
• identify and pose questions in familiar contexts that can be investigated scientifically
• conduct scientific investigations to find answers to questions

Design & Production (S2):
• investigate and research materials, components, tools and techniques to produce design solutions (ACTDEP014)
• evaluate design ideas, processes and solutions, based on criteria for success (ACTDEP017)

Material World (S2):
• describe examples of changes of state in everyday life SysT
• predict and observe the effects of adding or removing heat on a variety of solids and/or liquids SciT

Physical World (S2):
• observe how contact and non-contact forces cause changes in the motion of objects, for example: (ACSSU076)
- changes in speed
- changes in direction

5-6 SPIKE PRIME LEVEL 1



In this class students will build a foundation of robotics and coding skills. They will unlock their creative potential and critical thinking skills, designing and building robots using LEGO.

Students will use their engineering skills to bring their robot to life and code instructions for them. They will also use their robots to carry out a scientific investigation and design robots for a race.

If your school has purchased LEGO Spike Prime kits or has accessed the stem.T4L Inventor Robotics Kit, this course will model for teachers how these resources can be used in the classroom.

Syllabus Outcomes

Design & Production (S3):
• investigate materials, components, tools, techniques and processes required to achieve intended design solutions (ACTDEP024)
• design, modify and follow simple algorithms
• implement digital solutions as visual programs involving branching, iteration and user input (ACTDIP020)

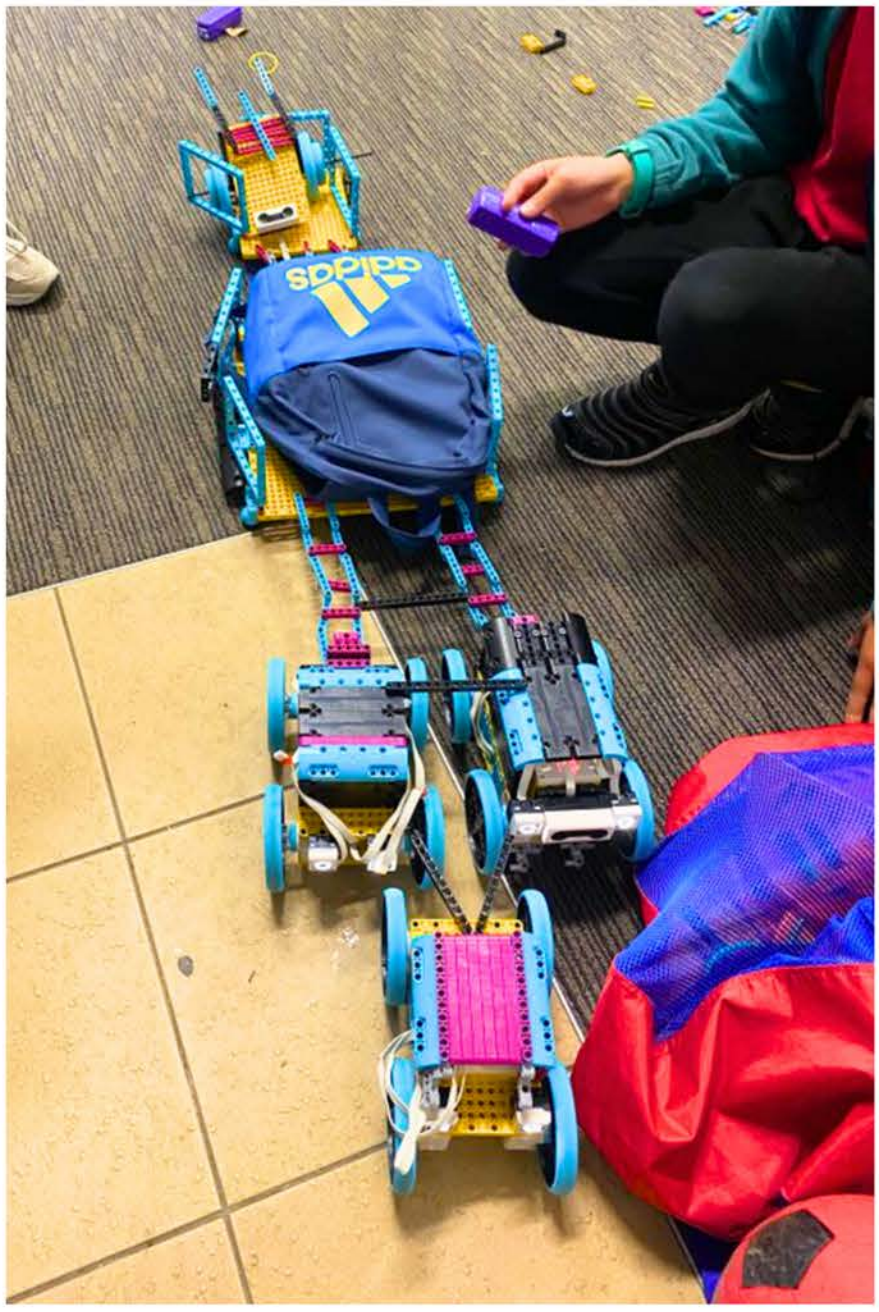
Digital Technologies (S3):
• investigate internal and external components of digital systems that perform functions SciT
• explore how the main components of digital systems connect together to form networks that transmit data (ACTDIK014) ComT SysT
• describe how data can be transmitted between two digital components, for example:
- wired networks
- wireless networks
• design, modify and follow algorithms involving branching and iteration ComT DesT SysT
• define problems, and plan and implement digital solutions, using an appropriate visual programming language involving branching and iteration, and requiring user input ComT DesT SysT

5-6 SPIKE PRIME LEVEL 2

Note: *This is the second class in the Spike Prime series. Before taking this class, students should have first completed Spike Prime Level 1.*

Students will build on their robotics skills by programming sensors. They will use their coding and building expertise to solve a range of problems with themes such as sustainability and collaboration.

Students will also have the chance to think creatively with independent building and creating, and will present their designs at the conclusion of the session.



Syllabus Outcomes

Design & Production (S3):
• investigate materials, components, tools, techniques and processes required to achieve intended design solutions (ACTDEP024)
• design, modify and follow simple algorithms
• implement digital solutions as visual programs involving branching, iteration and user input (ACTDIP020)

Digital Technologies (S3):
• investigate internal and external components of digital systems that perform functions SciT
• explore how the main components of digital systems connect together to form networks that transmit data (ACTDIK014) ComT SysT
• describe how data can be transmitted between two digital components, for example:
- wired networks
- wireless networks
• design, modify and follow algorithms involving branching and iteration ComT DesT SysT
• define problems, and plan and implement digital solutions, using an appropriate visual programming language involving branching and iteration, and requiring user input ComT DesT SysT

5-6 SPECIAL EFFECTS

Students will explore how science is used to create magical special effects in television and film.

This course includes:

- Creating magical, colour-changing potions and mysterious dry ice fog
- Surviving a zombie attack with an organ dissection and virus tracing
- Creating fake wounds using special effects makeup

Syllabus Outcomes

Working Scientifically (S3):
• make and justify predictions about scientific investigations (ACSIS231, ACSIS232)
• plan and apply the elements of scientific investigations to answer problems
• present data as evidence in developing explanations (ACSIS218, ACSIS221)

Living World (S3):
• understand that scientific and technological knowledge is used to solve problems and inform personal and community decisions (ACSHE083, ACSHE100) SciT

Material World (S3):
• investigate and compare the properties of solids, liquids and gases (ACSSU077) SciT
• explore that when materials are combined the result is either a mixture or a new substance, for example: (ACSSU095) SciT
- salt and water
- bicarbonate of soda and vinegar
• investigate characteristics and properties of a range of materials and evaluate the impact of their use (ACTDEK023) DesT SciT

Our Excursions

Our science excursions are offered at our Macquarie University location. There are toilets on site as well as a grassy area with shade for breaks and meals. Parking can be organised if you are travelling by bus or other vehicles, or we can advise on the best public transport options for you.

Accessibility

Our classrooms are accessible for wheelchair and mobility aid users. Accessible parking and accessible toilets are located directly next to our classrooms.

Registered assistance animals are warmly welcomed to our programs. A water bowl is available if needed. The nearest green space is directly next to our classrooms. If your group is attending any of our programs with an assistance animal, we ask that you let us know in advance.

Our programs may include activities that create noise (such as balloons popping) and a wide range of sensory experiences (such as touching and tasting different substances). If you have specific accessibility needs or concerns about attending our programs, please email us so that we can ensure that that all students have the best possible experience.

Availability and Costs

Group sizes and costs vary for different excursions. Please see the details for each excursion on the following pages.

K-1 SPACE CADETS

Students will explore the objects we see in the sky, including the sun, moon and stars!

This course includes:

- A visit to the planetarium (on-campus at Macquarie University) to explore the solar system
- Discovering how stars are born and creating a “nebula in a jar” to take home
- Investigating how craters are formed on the moon, with some hands-on blasting!

Cost: $45 per student (includes planetarium visit); $30 per student (without planetarium visit)

Syllabus Outcomes

Working Scientifically (S1):

- respond to posed questions
- explore and answer questions through participation in guided scientific investigations (ACSIS025, ACSIS038)
- represent and communicate observations and ideas in a variety of ways (ACSIS029, ACSIS042)

Earth & Space (S1):

- record the observable changes that occur in the sky and on the land, for example: (ACSSU019) SysT
  - patterns in the position of the Sun across a day
  - the appearance of the Moon and stars at night
  - changes in the shape of the moon
- observe, ask questions about and describe changes in objects and events (ACSHE021, ACSHE034) SciT

2-3 BIRD TIME LUCKY

Students will become ornithologists and soar into the world of birds, investigating how their adaptations help them survive in their natural environment.

This course includes:

- Bird spotting and identification in the natural environment
- A visit to the Biology Museum to explore bird bodies
- Investigating how birds build nests and use their adaptations to find food

Syllabus Outcomes

Working Scientifically (S1):

- record observations accurately and honestly using observational drawings, labelling, informal measurements and digital technologies (ACSIS026, ACSIS039)
- compare observations with those of others (ACSIS213, ACSIS041)

Living World (S1):

- describe the external features of a variety of living things (ACSSU017)
- identify and group plants and animals using their external features, for example: SciT SysT
  - native and introduced plants and animals
  - worms, insects, fish, reptiles, birds and mammals
- identify that living things live in different places that suit their needs (ACSSU211)
- explore how living things grow, change and have offspring similar to themselves (ACSSU030) SciT
- describe adaptations as existing structures or behaviours that enable living things to survive in their environment (ACSSU043) SciT
- describe the structural and/or behavioural features of some native Australian animals and plants and why they are considered to be adaptations, for example: ComT SciT
  - shiny surfaces of leaves on desert plants
  - rearward facing pouch of a burrowing wombat
  - spines on an echidna

3-4 SOLAR SYSTEM EXPLORERS

Students will explore the planets, comets, black holes and more that make up our solar system and beyond!

This course includes:

- A visit to the planetarium (on-campus at Macquarie University) to explore the solar system
- Designing a Martian landing vehicle
- Creating comets with dry ice and constructing a scale solar system model

Cost: $45 per student (includes planetarium visit); $30 per student (without planetarium visit)

Syllabus Outcomes

Working Scientifically (S2):

- conduct scientific investigations to find answers to questions
- suggest possible reasons for findings (ACSIS060, ACSIS068)

Design & Production (S2):

- define a need or opportunity according to functional and aesthetic criteria
- consider potential resources in defining design needs and opportunities
- develop, record and communicate design ideas and decisions using appropriate technical terms
- evaluate design ideas, processes and solutions, based on criteria for success (ACTDEP017)

Material World (S2):

- predict and observe the effects of adding or removing heat on a variety of solids and/or liquids SciT
- develop a design solution for an identified need or opportunity, using a variety of tools and materials that considers factors such as sustainability and time (ACTDEK010) DesT

Earth & Space (S2):

- identify the Sun as a major source of energy

5-6 BUSH TUCKER AND BEYOND

Students will explore how Aboriginal and Torres Strait Islander Australians use plants for food and medicine.

This course includes:

- A visit to the bush tucker garden on campus at Macquarie University and bush tucker tasting
- An experiment to create medicine from plants and test its active ingredients
- Discovering how seaweed is used by Aboriginal and Torres Strait Islander people

Syllabus Outcomes

Working Scientifically (S3):

- pose testable questions
- make and justify predictions about scientific investigations (ACSIS231, ACSIS232)
- plan and apply the elements of scientific investigations to answer problems

Living World (S3):

- understand that scientific and technological knowledge is used to solve problems and inform personal and community decisions (ACSHE083, ACSHE100) SciT
- explore plants and animals, tools and techniques used to prepare food to enable people to grow and be healthy (ACTDEK021)
- plan, design and produce a healthy meal, for example: DesT
  - a bush tucker meal
  - sushi
  - salad
- explain a sustainable practice used by Aboriginal and/or Torres Strait Islander communities to manage food and fibre resources

ALL AGES
SENSORY SCIENCE SHOW

In this 90-minute session, students will explore science with all five senses. Our educators will carry out a range of chemical reactions and experiments, and children will be given the chance to investigate the results with their eyes, ears, hands and tastebuds!

This course includes:

- Mysterious dry ice fog and cloudy bubbles
- Mixing up edible slime and testing its properties
- Creating a delicious chemical reaction with sherbet

Availability and Costs

The Sensory Science Show can be booked for groups of up to 30 students on Mondays, Tuesdays and Wednesdays.

The cost is $25 per student, for a minimum group size of 20 students.

For larger or smaller groups, or multiple classes, please contact us and we can discuss availability.

BOOKINGS AND INQUIRIES

For booking enquiries, contact jsaschools@mq.edu.au or fill in the form via the QR code below.

While our programs are tried and tested for success, we are always keen to improve and adapt them for as many school contexts as possible.

If you have specific needs or requests for programs on a particular topic, please get in touch with us at jsaschools@mq.edu.au.