

# RATS AND MICE (including dissection)

## STANDARD OPERATING PROCEDURE

Approved 09/03/2022

Approval to conduct activities under this Standard Operating Procedure (SOP) is conditional upon pedagogical justification for this use of animals being documented by the activity leader and reviewed by the principal.

Schools may undertake the approved activities outlined in this SOP once authorised to do so by the Queensland Schools Animal Ethics Committee (QSAEC) Animal Ethics Officer.

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## SECTION 1 | OBLIGATIONS

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### 1.1. LEGAL OBLIGATIONS

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Schools have legal obligations under the [Animal Care and Protection Act 2001 \(Qld\)](#), the [Animal Care and Protection Regulation 2012 \(Qld\)](#), and the [Australian code for the care and use of animals for scientific purposes, 8<sup>th</sup> edition 2013 \(updated 2021\)](#) (Cwlth) (the Code), including:

- 1) ensuring persons in charge of an animal fulfil their duty of care to that animal
- 2) obtaining animal ethics approval prior to conducting scientific activities involving animals and acting in accordance with that approval once granted
- 3) reporting on the use of animals for scientific purposes.

**Non-compliance with this legislation may result in schools receiving a maximum fine of 300 penalty units. (Penalty unit value is notified in the [Penalties and Sentences Regulation 2015 \(Qld\)](#)).**

All Queenslanders have a 'general biosecurity obligation' under the [Biosecurity Act 2014 \(Qld\)](#). Schools are responsible for [managing biosecurity risks](#) that are under their control and that they know about, or should reasonably be expected to know about. Contact Biosecurity Queensland on 13 25 23 for advice on managing specific risks or to report [notifiable incidents](#).

### 1.2. DUTY OF CARE FOR ANIMALS

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If you are in charge of an animal, you have a duty of care to that animal - no matter why you are in charge of it, what you are using it for or how long it will be in your care. All decisions and actions involving the care and use of animals for scientific purposes must be underpinned by respect for animals. This respect is demonstrated by:

- using animals only when justified
- supporting the wellbeing of the animals involved
- avoiding or minimising harm, including pain and distress, to those animals
- applying high standards of scientific integrity
- applying the principles of [Replacement, Reduction and Refinement](#) (the 3Rs) at all stages of animal care and use through:
  - **replacement** of animals with other methods (alternatives)
  - **reduction** in numbers of animals used
  - **refinement** of techniques used, in order to minimise adverse impacts on animals
- knowing and accepting one's responsibilities.

### 1.3. PEDAGOGICAL JUSTIFICATION FOR THE USE OF ANIMALS IN EDUCATION

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It is the teacher's responsibility to provide a pedagogical justification for any learning activity that involves the use of animals, including activities approved under a SOP. The use of animals must provide an added component to the learning that is neither trivial nor available in other ways, and there must be evidence to support this position. **Planning documents must clearly identify how the use of animals is essential to achieving the learning objectives.** The justification should consider whether [non-animal alternatives](#) could achieve the same learning objectives, the minimum number of animals necessary to achieve the objectives, the impact on the animal/s involved and must balance whether the potential effects on the wellbeing of the animals are justified by the potential benefits of their use.

The QSAEC, when undertaking a site visit at the school, may request to see documentation detailing the pedagogical justification for the use of animals. If there are viable alternatives to animal use that meet the learning objectives, they must be used in preference to using animals. At all times the impact on the animal/s should be considered and, where appropriate, discussed with the students in an age-appropriate way.

**Activities outside the scope of this SOP must be considered by QSAEC before approval can be granted.**

To seek approval to conduct activities additional to those approved under this SOP or to modify an activity approved in this SOP, submit a [Modification, SOP variation or amendment form](#) in conjunction with the Application/Activity notification form at the last page of this SOP.

**Please note:** The QSAEC will **not** approve any activities classified as Category 4 in the [Categories of animal use](#).

## 1.4. ANIMAL HEALTH AND WELFARE

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[Responsibilities of school personnel under the Code](#) details obligations of staff under animal welfare legislation to promote the responsible care and use of animals for scientific purposes.

An **unexpected adverse event** is any event that may have a negative impact on the wellbeing of an animal and was not foreshadowed in the approved proposal, SOP or subsequent documents to QSAEC.

An unexpected adverse event may result from different causes, and includes but is not limited to:

- death of an animal, or group of animals, that was not expected (e.g. during surgery or anaesthesia, or after a procedure or treatment)
- adverse effects following a procedure or treatment that were not expected
- adverse effects in a larger number of animals than predicted during the planning of the project or activity, based on the number of animals actually used, not the number approved for the study
- a greater level of pain or distress than was predicted during the planning of the project or activity
- power failures, inclement weather, emergency situations or other factors external to the project or activity that have a negative impact on the welfare of the animals.

In the event of an unexpected adverse event or emergency, prompt action must be taken to address any adverse impacts on the animal/s. Alleviating unanticipated pain and distress must take precedence over an individual animal reaching the planned endpoint of the project, or the continuation or completion of the project. Emergency treatment may be required and, if necessary, animals must be humanely killed without delay.

In response to an unexpected adverse event, action and investigation by the activity leader or facility manager is required to ensure students, staff or other animals are not inadvertently affected. The specific response will depend on the animal and the circumstances. It may require seeking advice from a veterinarian to determine the best course of action (e.g. necropsy of the dead animal by the vet), removal of the deceased animal (e.g. by the supplier), or diagnostic investigations of facility or management practices to determine cause of death (e.g. water testing of fish tank, checking of ventilation).

All adverse events provide opportunities for students to learn from the experience. Activity leaders should optimise student learning outcomes (incidental and planned) by focussing on the learning potential of a specific event (e.g. prevention, animal welfare, diagnostic tools, treatment, security, harm minimisation).

Notify the QSAEC within 7 days of the event, using an [Unexpected adverse event report](#).

**Please note:** Necropsy of a dead animal is not an approved activity under this SOP due to potential health and biosecurity risks, and must only be performed by a competent person. QSAEC recommends that if a necropsy is required it is performed by a vet.

Further advice about reporting unexpected adverse events is available on the [Department of Agriculture and Fisheries \(DAF\) website](#).

## 1.5. STUDENT AND STAFF HEALTH

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Those involved in the care and use of animals should make themselves aware of the potential disease hazards and other associated occupational health and safety issues, and manage risks according to the school's risk management process. Apart from injuries which may occur due to handling animals, there are a variety of infectious diseases (zoonoses) that are transmissible from various animals to humans.

Zoonotic diseases are common and the illnesses they cause can be serious. They can be spread by direct contact with animals, for example via bites or scratches, or through contact with animal faeces, bodily fluids, airborne particles, birth products, or enclosures contaminated with these materials.

Staff should familiarise themselves with the zoonoses the animals in their care may potentially transmit, the routes of transmission and what activities may potentially expose staff or students to infection. This research will inform the risk assessment to determine how to manage these risks or determine whether the activity should be conducted at all.

For comprehensive advice regarding zoonotic diseases and precautionary measures to minimise risks to staff and students, refer to [Animal observation and handling](#), [Animal contact guidelines - reducing the risk to human health 2014 \(Interim\)](#) and [Preventing zoonoses](#).

[Risk management](#) of animal activities ensures the health, safety and well-being of students, staff and others involved. If a specific [Curriculum Activity Risk Assessment activity guideline](#) exists, that guideline must be adhered to at a minimum. Risks associated with [zoonotic diseases](#) carried by animals must be identified and measures planned to allow activities to be conducted with an acceptable level of residual risk.

Any incident or injury that occurs in association with an activity must be reported, recorded and notified in accordance with the school's health and safety incident recording procedures (e.g. state schools must adhere to the [Health safety, wellbeing and incident management procedure](#)).

## 1.6. RECORDKEEPING

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Schools must keep a school-based animal activity register which includes hard copy records relating to their use of animals for scientific purposes for seven years for audit purposes. This includes:

- scientific user registration (for non-state schools)
- signed applications, activity notification forms and modifications
- approval responses from QSAEC
- signed QSAEC reports (e.g. annual completion reporting, unexpected adverse events, complaints).

Clear and accurate records relevant to the particular species used in the activity/s should be readily available, including, as relevant:

- animal identification records (e.g. species and number of animals in each cage, description of markings or photos for individual identification)
- dates and sources of acquisition
- disposal details and dates
- feeding logs (times/amount)
- breeding records
- dates and types of husbandry practices carried out
- names, dosage, dates of any chemicals administered and veterinary treatment provided
- emergency contacts and procedures.

## SECTION 2 | QUALIFICATIONS, SKILLS AND EXPERIENCE

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Any teacher conducting scientific animal activity must have competency in the particular procedure and:

- a relevant science or science education qualification (e.g. Agricultural Science, Biological Science) or
- relevant science or science education experience as deemed appropriate by the school principal (generally 2 years' experience).

For new or inexperienced teachers (less than two years' experience), all activities must be conducted under the supervision of a Science or Agricultural Science Head of Department (HOD) or suitably experienced person.

Where direct supervision of a suitably experienced person is not available, a new or inexperienced teacher must:

- identify a mentor, maybe a Science or Agriculture HOD from a neighbouring school
- provide planning documents to the mentor.

Persons deemed to be suitably qualified must have:

- conducted risk assessments on the procedure/s to be carried out
- found the procedure/s to be safe and humane considering animal and student welfare
- considered the maturity and suitability of the student/s involved in the activity.

Teachers should ensure that animal users, including students, staff and volunteers, are provided with adequate prior instruction in specific activities to enable appropriate care of an animal and to minimise risk of undue stress or harm to an animal.

## SECTION 3 | STANDARDS OF PRACTICE - RATS

### 3.1. PHYSICAL ATTRIBUTES OF RATS

|                         |   |
|-------------------------|---|
| Size                    | Length from snout to base of tail: 17-21cm<br>Length of tail: 20-23cm<br>Overall length: 37-44cm            |
| Weight                  | Adult male: 200-400g<br>Adult female: 250-300g  |
| Age at adult size       | 12-14 weeks   |
| Average life span       | 3 years   |
| Weight at birth         | 5-6g  |
| Gestation period        | 20-23 days  |
| Number of offspring     | 9-11  |
| Weaning                 | approximately 21 days   |
| Healthy characteristics | Body temperature: 37°C-38°C<br>Heart rate: 300 beats per minute<br>Respiration rate: 100 breaths per minute |
| Range of breeding ages  | 3-15 months recommended   |

### 3.2. ENVIRONMENT

Rats should not be housed with any other species. A cage or nesting place should be seen as the animal's home or domain and disturbed as little as possible. It must be remembered that environmental requirements of small mammals are complex. Housing should allow rats the opportunity for social interaction, the opportunity to carry out normal behaviours and the opportunity to rest and withdraw from each other.

**SPACE** Rats should be housed indoors. Minimum height of cage must be 25cm. Adults and juveniles up to 450g require an area of 400cm<sup>2</sup> per rat. Adults and juveniles above 450g require an area of 800cm<sup>2</sup> per rat.

**TEMPERATURE** 18°C-22°C. Avoid large fluctuations. Rats can easily suffer from heat stress. If the temperature rises above 30°C ensure rats are regularly monitored. On hot days consider providing a frozen ice brick or drink bottle in the nesting area to reduce the temperature.

**LIGHT** Preferably good natural lighting or artificial light with the full range of spectral colours, 45-60 lux. Cages should be kept out of direct sunlight. Shelter should also be provided within the cage to allow the rats to avoid light. Students should be able to observe that rats will seek darkness if it is available to them. There should be 12-hour periods of both light and darkness.

As Albino rats are sensitive to light, they should be kept under low light intensity except when being examined. Rats with dark pigmented eyes are more suitable for the classroom.

**VENTILATION** Ensure good natural ventilation, without draughts.

**BEDDING** Rats have relatively poor eyesight and rely heavily on their sense of smell and create patterns of urine markings to compartmentalise their environment or for territorial purposes. Provision of appropriate bedding is essential. Bedding should be highly absorbent, dust-free, splinter-free, non-toxic, non-edible and not contaminated with pesticides or chemicals. Suggested bedding is sawdust, wood shavings, clean shredded paper, soft cardboard, rice hulls or absorbent paper pellets.

**NESTING** Breeding animals must be provided with the opportunity to nest. Easily shredded materials should be provided. Cotton wool should not be used as it can wrap around the legs of young rats and cause injury.

**ENVIRONMENTAL ENRICHMENT** Environmental enrichment is essential to provide variety and stimulation in an artificial environment to enable normal animal behaviour. Environmental enrichment should mimic natural habitat and behavioural requirements including in particular tunnelling, foraging, climbing, social groupings and nesting. Enrichment items can be provided on a rotating basis to increase their novelty value.

**MOVEMENT AND EXERCISE** Research shows that rats do not appear to use physical exercise to maintain muscle tone or to work off reserve fat. Caged rats spontaneously exercise by playing with cage mates or during feeding. If exercise equipment is provided (e.g. running wheels) it will only be used by very young rats or by adult females during oestrus. Elevated boxes and tubes, made of either cardboard or polycarbonate, make excellent exercise areas.

**CLEANING** Cages should be cleaned regularly, at least twice weekly, then washed in disinfectant and thoroughly dried. New bedding should be supplied and old bedding disposed of in a suitable manner.

### 3.3. FOOD AND WATER REQUIREMENTS

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Rats can easily become overweight and obese if their diet is not managed correctly. Commercially prepared rat pellets or cubes are recommended as they provide all the basic requirements. See manufacturer's recommendation for appropriate quantities. However, as rats are omnivores and enjoy variety in their food, the diet can be supplemented with fresh fruit and vegetables or suitable seeds such as corn and sunflower seeds. Rats' teeth grow continuously, so hard-shelled nuts or other gnawing material, such as blocks of untreated timber, must be included to prevent overgrowth. The article, [What should I feed my pet rat](#) provides examples of suitable and unsuitable foods for rats.

As rats like fresh food, purchase small amounts only. Lactating females must be provided with approximately four times the amount of food and water normally required by an adult rat.

A clean, adequate supply of water must be available. In hot weather, an adult rat needs approximately 24-35ml of water daily. As rats contaminate water in dishes and bowls, a suspended feeder bottle of adequate size is required.

### 3.4. NORMAL BEHAVIOUR

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Healthy rats are alert, active and inquisitive, and learn by exploration.

They experience a range of emotions and demonstrate memory, empathy and metacognition.

Rats have clear and wide open eyes. Their ears stand up straight and their fur is dense and sleek.

Normal caged behaviour includes running, jumping, standing on hind legs and some climbing, if cage facilities allow. Male rats are more aggressive than females and more inclined to bite. Rats rarely bite without provocation and, then, only once, not repeatedly.

Environmental enrichment will assist in increasing the number of natural behaviours a rat exhibits (e.g. foraging, positive social behaviour, increased physical activity) and decreasing the number of unnatural or unwanted behaviours caged rats may exhibit. The presence of hair from domestic animals may trigger fear in rats, therefore cleanliness of handlers is important.

Rats are social animals and are best kept in single sex groups if not breeding. They should not be kept as solitary animals.

Rats are nocturnal animals and are far more active at night. It is normal behaviour for rats to rest huddled together to conserve body heat during daylight hours. A healthy rat sleeps curled in a foetal position. Extension is a sign of ill health. Cannibalism is rare but does occur and is usually indicative of inadequate diet or maintenance.

Pregnant females show nest building activity prior to birth and during lactation. During the breeding period, it is normal behaviour for the male to nibble the female's head or body and to examine her ano-genital area prior to copulation.

### 3.5. BREEDING MANAGEMENT

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In accordance with s.4.6 of the [Code](#), animal breeding that does not achieve an educational outcome in science and fails to provide for the lifetime welfare of animals (and their offspring) cannot be demonstrated to, or carried out by, students.

If breeding is to take place in a school there must be sufficient care, facilities, housing and space available for the extra animals. Animals must not be euthanased at the end of the program. If no suitable arrangements can be made to rehouse the animals then the program should not proceed. Breeding animals for dissection is not approved under this SOP.

When choosing rats to breed, both the male and female should be of good temperament. Breeding of older rats should be avoided.

Female rats should not be bred before 65 days of age. They come into heat every four to five days unless they are bred. The actual period during which the female is receptive to the male and will allow breeding is approximately 12 hours and usually occurs at night. A female rat will become dominant over other females in the cage in the first few weeks of pregnancy.

Female rats are capable of coming back into heat 48 hours after giving birth to a litter. Breeding males should be removed from the enclosure just before the female delivers her litter because of the strong probability of injury to the new pups by the male.

Pregnancy lasts an average of three weeks. Litters can be as large as 11, which should be considered when determining whether to conduct a breeding activity. Female rats must not be disturbed for the first few days after delivery because stressed females may destroy their pups.

Pups are usually weaned when three weeks old. The female will resume her breeding cycle between two to five days after pups are weaned.

### 3.6. SUPERVISION AND MONITORING

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Live animals must be inspected at least once a day to assess health and wellbeing. Feeding, watering and cleaning logs/schedules must be easily accessible, preferably displayed, for ease of monitoring.

Diligence in observation of live animals does not alter on weekends and holidays. Staff members need to be rostered to maintain observation schedule as per weekdays.

Staff should ensure that appropriate records are maintained.

### 3.7. HANDLING

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Rats need to be handled calmly and with care to prevent distress and injury to the animal and the handler. Well-designed refuges assist in catching rats. If rats hide under structures, such as elevated shelves or nest boxes, they can be easily caught without struggling.

Rats should be conditioned to being handled from a young age so that they are well prepared for handling by students.

### 3.8. DISEASE PREVENTION

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Where appropriate, disease control methods and internal and external parasite control programs should be developed in consultation with veterinarians. All activities should be documented using the appropriate records.

Quarantining and isolating new rats from existing rats is an essential part of controlling illness and disease amongst rats.

Regular cleaning and good ventilation of the housing environment greatly influences the risk of illness and disease. Rats are very sensitive to the effects of urinary ammonia that can cause irritation to the lining of their respiratory system. Bedding must be changed at least twice a week as ammonia may rise to dangerous levels and impact negatively on the rat's health.

### 3.9. SIGNS OF ILLNESS

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Any of the following symptoms may be an indication of illness:

- a failure to thrive or grow
- discharge from eyes, nose, urinary or genital organs
- sores, scabs or areas of fur loss
- coughs and sneezing
- lumps under the chin due to enlarged glands
- constant scratching
- lack of balance, stumbling or stiff legged gait

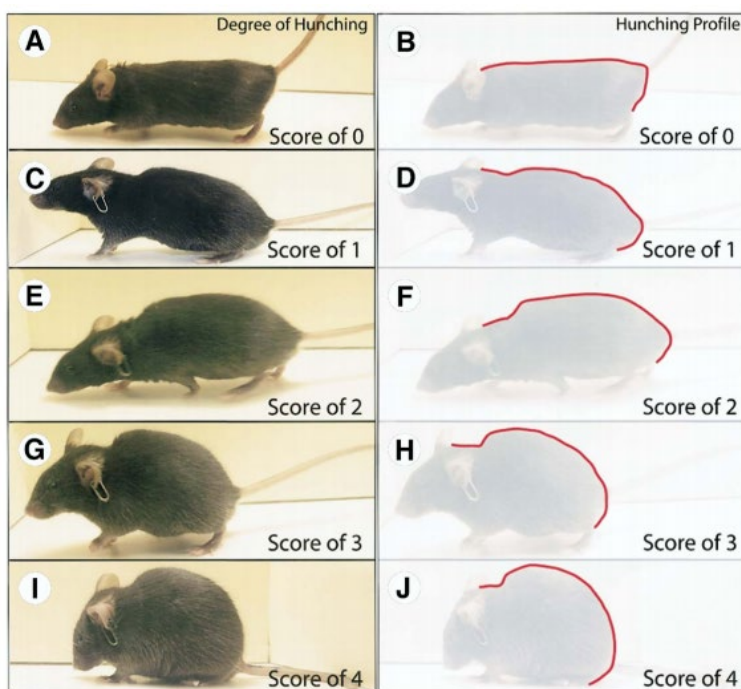


- soft faeces with an unpleasant smell
- loose skin, which is a sign of weight loss
- prostration or extension
- lumps in or under skin due possibly to tumours or abscessation
- jumping or freezing
- squeaking, whistling, screeching, and producing ultrasound
- biting or escape behaviour
- sunken sides (in case of abdominal pain)
- displaying pica-behaviour (eating bedding material or other non-food objects)
- changes in facial expression
- hunching stance.

Excessive grooming by rats can be an indication of stress. Changes in facial expression can provide an indication of pain and discomfort in rats as shown in the [Rat grimace scale](#). A hunching stance also generally indicates pain or illness. Refer to Figure 1 for examples of increased degrees of hunching where a score of 0 shows a normal stance progressing in pain severity to a score of 4. Additional information about pain associated behaviour in rats is available [here](#).

Animals with any of these symptoms should be immediately isolated from other animals and their cages fully disinfected if required. If the cause of ill health cannot be identified or corrected, seek assistance from a veterinarian familiar with rats. Any signs of illness or injury, and treatment given, must be documented in the appropriate records.

**Figure 1:** Normal stance versus hunching stance for determining the health of rodents



Source: [Endogenous Opioids Inhibit Early-Stage Pancreatic Pain in a Mouse Model of Pancreatic Cancer](#), Gastroenterology 2006;131:900 –910.

### 3.10. ANIMAL EMERGENCY ARRANGEMENTS

The school must have an emergency management plan to deal with events in and out of school hours. Details of the plan will vary according to the needs of each school and must include:

- signage that includes emergency contacts, animal identification details
- monitoring of animals, including on weekends and school holidays
- a first aid kit for animals
- at least one local veterinarian on call
- strategies to withdraw individual animals (e.g. due to illness or death) or all stock (e.g. due to equipment issues, leaks, natural disasters, vandalism)
- arrangements for power outages (e.g. checking on backup power, battery level checking)

- a list of who is competent to euthanase animals if necessary (this is likely to be the local veterinarian)
- a schedule of persons authorised to respond to emergencies and engage veterinary assistance.

### 3.11. HUMANE KILLING AND EUTHANASIA

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Where an animal has become so sick, diseased or injured that recovery is unlikely or undesirable on humane grounds, euthanasia must be arranged with a local veterinarian or a person competent in the technique for rats.

Humane killing of animals due to overbreeding or termination of an activity is not approved under this SOP.

Deaths and other unexpected adverse events must be advised to QSAEC as soon as practicable after the incident's occurrence, using the [Unexpected adverse event report](#). The signed hardcopy should be held in the school's animal activity register.

### 3.12. DISPOSAL – FATE PLANNING

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Forward planning (e.g. how and when to retire an animal from the program) will support animal welfare and wellbeing and ensure that animals used are fit to fulfil the needs of the program.

A disposal plan needs to be considered before using an animal in any program. Arrangements for rehousing animals at the end of the program must be made for live animals. Animals may not be euthanased at the end of the program. If no suitable arrangements can be made to rehouse the animals then the program should not proceed.

Dead rats or rats that were euthanased due to illness or injury should be placed individually into plastic bags, sealed and placed in the garbage disposal service for your site.

## SECTION 4 | STANDARDS OF PRACTICE - MICE

### 4.1. PHYSICAL ATTRIBUTES OF MICE

|                         |   |
|-------------------------|---|
| Varietal range          | There are over 330 known species of mice. There is a huge variety of fur colour combinations and several different fur types such as long haired or curly haired. |
| Size                    | Length from snout to base of tail: 7cm-9cm<br>Length of tail: 7cm-9cm<br>Overall length: 14cm-18cm  |
| Weight                  | Adult male: 20g-40g<br>Adult female: 25g-90g  |
| Age at adult size       | 10-12 weeks   |
| Average life span       | 18-24 months  |
| Weight at birth         | 1-1.5g  |
| Gestation period        | 19-21 days  |
| Number of offspring     | 8-11  |
| Weaning                 | 20 days   |
| Healthy characteristics | Body temperature: 37°C – 38°C<br>Heart rate: c. 600 beats per minute<br>Respiration rate: c. 160 per minute   |
| Range of breeding ages  | 2.5-12 months is recommended  |

### 4.2. ENVIRONMENT

Mice are social animals and should, wherever possible, be maintained in stable, harmonious social groups. They should not be housed with other species. A cage or nesting place should be seen as the animal's home or domain and disturbed as little as possible. It must be remembered that environmental requirements of small mammals are complex. Housing should allow mice the opportunity for social interaction, the opportunity to carry out normal behaviours and the opportunity to rest and withdraw from each other.

Cage designs are numerous and ever-changing but it is important that they meet the standards required for safety, security, ease of cleaning, animal comfort and allow student observation. Most pet shops supply plastic mouse cages that are well-designed, or an unused aquarium with a wire mesh lid makes an excellent container.

**SPACE** Mice should be housed indoors. Minimum height of cage must be 12.5cm. Minimum floor area required is 500cm<sup>2</sup> per pair or trio plus litter.

**TEMPERATURE** 18°C-25°C, if provided with good bedding and shelter during environmental extremes. Avoid large fluctuations in temperature. Mice can easily suffer from heat stress. If the temperature rises above 30°C ensure mice are regularly monitored. On hot days consider providing a frozen ice brick or drink bottle in the nesting area to reduce the temperature.

**LIGHT** Preferably good natural lighting or artificial light with the full range of spectral colours, 45 lux-60 lux. Cages should be kept out of direct sunlight and, within the cage, shelter should be provided for the mice. Students should be able to observe that mice will seek darkness if it is available to them. There should be 12-hour periods of both light and darkness.

**VENTILATION** Good natural ventilation, without draughts, is required.

**BEDDING** Mice have relatively poor eyesight and rely heavily on their sense of smell and create patterns of urine markings to compartmentalise their environment or for territorial purposes. Provision of appropriate bedding is essential. Bedding should be highly absorbent, dust-free, splinter-free, non-toxic, non-edible and not contaminated with pesticides or chemicals. Suggested bedding includes sawdust, wood shavings, clean shredded paper, soft cardboard, rice hulls or absorbent paper pellets.

**NESTING** Breeding animals must be provided with the opportunity to nest. Easily shredded materials should be provided. Cotton wool should not be used as it can wrap around the legs of young mice and cause injury.

**ENVIRONMENTAL ENRICHMENT** Environmental enrichment is essential to provide variety and stimulation in an artificial environment to enable normal animal behaviour. Environmental enrichment should mimic natural habitat and behavioural requirements including in particular tunnelling, foraging, climbing, social groupings and nesting. Enrichment items can be provided on a rotating basis to increase their novelty value.

**MOVEMENT AND EXERCISE** While everyday activities give mice adequate exercise, they seem to enjoy exercise equipment if it is available. A running wheel is usually very well utilised. Elevated boxes and tubes, made of either cardboard or polycarbonate, make excellent exercise areas.

**CLEANING** Cages should be cleaned at least twice weekly then washed in disinfectant and thoroughly dried. New bedding should be supplied and old bedding disposed of appropriately. Mice should be returned to the same cage in the same site, as changes stress mice.

### 4.3. FOOD AND WATER REQUIREMENTS

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Mice can easily become overweight and obese if their diet is not managed correctly. Commercially-prepared mice pellets or cubes are recommended as they provide all the basic requirements. Refer to manufacturer's recommendations for quantity to be fed. However, mice enjoy variety in their food so the diet can be supplemented with fresh fruit and vegetables and suitable seeds in small amounts. The article, [What should I feed my mice](#) provides examples of suitable and unsuitable foods for mice.

Lactating females must be provided with approximately four times the amount of food and water normally required by an adult mouse.

A clean, adequate supply of water must always be available. An adult mouse needs approximately 4-7ml daily and a lactating female could require up to 14ml daily in hot weather. As mice contaminate water in dishes and bowls, a suspended feeder bottle of adequate size is required.

### 4.4. NORMAL BEHAVIOUR

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Healthy mice are alert, active and inquisitive, and learn by exploration.

Mice experience a range of emotions and demonstrate memory and empathy.

They have bright, clear, open eyes. Their ears stand up straight and their fur is dense and sleek. The behaviour of mice in laboratory conditions depends on how many mice are caged together, the size and type of the cage, and the environmental conditions. Mice are very agile acrobats and normal caged behaviour includes running, jumping, standing on hind legs and climbing. They are social animals and should not be kept as solitary animals. If they are not breeding, mice are best kept in single sex groups that have been established shortly after weaning.

Environmental enrichment will assist in increasing the number of natural behaviours mice exhibit (e.g. foraging, positive social behaviour, increased physical activity) and decreasing the number of unnatural or unwanted behaviours caged mice may exhibit.

Mice are nocturnal animals and are far more active at night. They feed predominantly at night. During daylight hours, it is normal behaviour for mice to rest huddled together to conserve body heat. A healthy mouse sleeps curled in a foetal position, extension is a sign of ill health.

Mice are rarely aggressive but will bite if frightened. Some strains of mice are aggressive and are not suitable for use in the classroom. Cannibalism is rare but does occur. It is usually indicative of inadequate diet or poor maintenance.

Pregnant females show nest building activity prior to birth and during lactation. During the breeding period, it is normal behaviour for the male to nibble the female's head or body and to examine her ano-genital area, prior to copulation.

### 4.5. BREEDING MANAGEMENT

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In accordance with s.4.6 of the [Code](#), animal breeding that does not achieve an educational outcome in science and fails to provide for the lifetime welfare of animals (and their offspring) cannot be demonstrated to, or carried out by, students.

If breeding is to take place in a school there must be sufficient care, facilities, housing and space available for the extra animals. Animals must not be euthanased at the end of the program. If no suitable arrangements can be made to rehouse the animals then the program should not proceed. Breeding animals for dissection is not approved under this SOP.

Females can start reproducing from 6 weeks of age and continue until they are approximately 12 months old.

Female mice should not be bred before 50 days of age. They continuously come into heat every four to five days unless they are bred. The actual period during which the female is receptive to the male and will allow breeding is approximately 12 hours and usually occurs at night. Female mice are capable of coming back into heat within 14 to 28 hours after giving birth to a litter.

Pregnancy lasts an average of three weeks. Cannibalism of pups is rare. It is wise not to disturb mice for the first two to three days after giving birth. The female will resume her breeding cycle between two and five days after the pups have been weaned.

If the activity is to continue over subsequent years, turnover of breeding animals is important due to the risk of mutations and susceptibility to disease.

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#### 4.6. SUPERVISION AND MONITORING

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Live animals must be inspected, at least once a day, to assess health and wellbeing. Feeding, watering and cleaning logs/schedules must be easily accessible, preferably displayed, for ease of monitoring.

Diligence in observation of live animals does not alter on weekends and holidays. Staff members need to be rostered to maintain observation schedule as per weekdays.

Staff should ensure that appropriate records are maintained.

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#### 4.7. HANDLING

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Mice need to be handled calmly and with care to prevent distress and injury to the animal and the handler. Well-designed refuges assist in catching. If mice hide under structures such as elevated shelves or nest boxes, they can be easily caught without struggling.

Mice should be conditioned to being handled from a young age so that they are well prepared for handling by students.

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#### 4.8. DISEASE PREVENTION

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Where appropriate, disease control methods and internal and external parasite control programs should be developed in consultation with veterinarians. All activities should be documented using the appropriate records.

Quarantining and isolating new mice from existing mice is an essential part of controlling illness and disease amongst mice.

Regular cleaning and good ventilation of the housing environment greatly influences the risk of illness and disease. Mice are very sensitive to the effects of urinary ammonia that can cause irritation to the lining of their respiratory system. Bedding must be changed at least twice a week as ammonia may rise to dangerous levels and impact negatively on the mice's health.

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#### 4.9. SIGNS OF ILLNESS

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Any of the following symptoms may be an indication of illness:

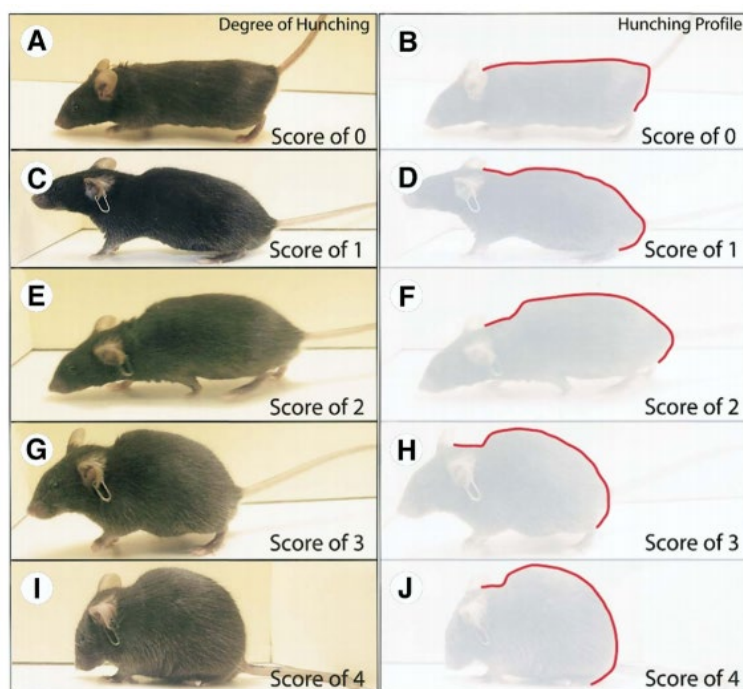
- a failure to thrive or grow
- reluctance to move
- unkempt, erect coat
- discharge from the eyes, nose, urinary or genital organs
- coughing and sneezing
- constant scratching
- lack of balance, stumbling or stiff legged gait

- soft faeces with an unpleasant smell
- loose skin, which is a sign of weight loss
- prostration or extension
- bumps or lumps which can indicate possible growths or abscesses
- withdrawal from their social group
- aggression or restlessness
- rapid breathing
- displaying pica-behaviour (eating bedding material or other non-food objects)
- changes in facial expression
- hunching stance.

Changes in facial expression can provide an indication of pain and discomfort in mice as shown in the [Mouse grimace scale](#). A hunching stance also generally indicates pain or illness. Refer to Figure 2 for examples or increased degrees of hunching where a score of 0 shows a normal stance progressing in pain severity to a score of 4. Additional information about pain associated behaviour in mice is available [here](#).

Animals with any of these symptoms should be immediately isolated from other animals and their cages fully disinfected if required. If unable to identify and correct the cause of ill-health, assistance should be sought from a veterinarian who is familiar with mice. Any signs of illness or injury, and treatment given, should be documented in the appropriate records.

**Figure 2: Normal stance versus hunching stance for determining the health of rodents**



Source: [Endogenous Opioids Inhibit Early-Stage Pancreatic Pain in a Mouse Model of Pancreatic Cancer](#), Gastroenterology 2006;131:900 –910.

#### 4.10. ANIMAL EMERGENCY ARRANGEMENTS

The school must have an emergency management plan to deal with events in and out of school hours. Details of the plan will vary according to the needs of each school and must include:

- signage that includes emergency contacts, animal identification details
- monitoring of animals, including on weekends and school holidays
- a first aid kit for animals
- at least one local veterinarian on call
- strategies to withdraw individual animals (e.g. due to illness or death) or all stock (e.g. due to equipment issues, leaks, natural disasters, vandalism)
- arrangements for power outages (e.g. checking on backup power, battery level checking)

- a list of who is competent to euthanase animals if necessary (this is likely to be the local veterinarian)
- a schedule of persons authorised to respond to emergencies and engage veterinary assistance.

#### 4.11. HUMANE KILLING AND EUTHANASIA

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Where an animal has become so sick, diseased or injured that recovery is unlikely or undesirable on humane grounds, euthanasia must be arranged with a local veterinarian or a person competent in the technique for mice.

Humane killing of animals due to overbreeding or termination of an activity is not approved under this SOP.

Deaths and other unexpected adverse events must be advised to QSAEC as soon as practicable after the incident's occurrence, using the [Unexpected adverse event report](#). The signed hardcopy should be held in the school's animal activity register.

#### 4.12. DISPOSAL – FATE PLANNING

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Forward planning (e.g. how and when to retire an animal from the program) will support animal welfare and wellbeing and ensure that animals used are fit to fulfil the needs of the program.

A disposal plan needs to be considered before using an animal in any program. Arrangements for rehousing animals at the end of the program must be made for live animals. Animals may not be euthanased at the end of the program. If no suitable arrangements can be made to rehouse the animals then the program should not proceed.

Dead mice or mice that were euthanased due to illness or injury should be placed individually into plastic bags, sealed and placed in the garbage disposal service for your site.

## SECTION 5 | APPROVED ACTIVITIES

All activities must be conducted in line with industry and veterinary standards. Chemicals and drugs used must be judged to be required by a qualified instructor, must be registered products, and must be used in accordance with Safety Data Sheet information and manufacturer's instructions.

**Note:** Instructor:student and student:animal ratios cannot always be specified with accuracy given the wide variety of class sizes, student ages and settings in which activities are being conducted. While ratios stated in this document for dissection are minimum requirements, careful consideration must be given to determine ratios that are most effective in supporting and safeguarding animal wellbeing.

### 5.1. BREEDING OF RATS OR MICE IN THE CLASSROOM

| Category 3 – moderate to high impact      |   |  |   |            |
|---|---|--|---|------------|
| Activity                                  | Objective   | 3R activities                                | Ratios  | References |
| Breeding of rats or mice in the classroom | To instruct students in the breeding of rats or mice in the classroom | Theoretical learning, modelling, simulations | <b>Instructors:Students</b><br>1:30 instructing<br>1:30 supervising<br><b>Students:Animals</b><br>No ratio specified. |            |

Rats and mice may not be bred for the purpose of dissection. An activity that involves breeding rats or mice needs to be carefully thought out before starting. Facilities to separate and house rats or mice by gender are essential. To ensure that breeding does not occur, the male and pregnant females should be separated prior to the birth. Offspring should be separated into single sex groups at weaning. A plan for the disposal of surplus animals must be in place prior to beginning this activity. If killing is the only disposal option, then the breeding program is not allowed. Check with the local council in your area to ensure that this activity is acceptable there.

### 5.2. CAPTURE, RESTRAINT AND HANDLING

| Category 2 - low impact         |  |   |  |  |
|---------------------------------|--|---|--|--|
| Activity                        | Objective  | 3R activities                                       | Ratios   | References   |
| Capture, restraint and handling | To instruct students in the capture, restraint and handling of rats and mice | Step-by-step guides, modelling, videos, simulations | <b>Instructors:Students</b><br>1:30 instructing<br>1:30 supervising<br><b>Students:Animals</b><br>30:1 observing<br>1:1 performing | <a href="#">NSW Animals in Schools – Rats</a> ;<br><a href="#">NSW Animals in Schools – Mice</a> |

Students can catch, pick up and handle the rats and mice during classroom activities and for maintenance. Prior training must be given to students in the appropriate methods of handling, as detailed earlier. Only animals which are accustomed to being handled should be used.

All handling should be gentle and unhurried. Nervous people should not attempt to handle the animals. Sudden loud noises and jerky movements must be avoided at all times. Gloves are unnecessary and undesirable as they lead to clumsy handling.

Always approach animal from behind and grip it firmly with the thumb and forefinger, forming a circle round the neck. The head and one front paw should be included in this grip while the second front paw is held between the forefinger and the middle finger. Use the other hand to support the pelvis and tail from behind and hold the rear paws between the thumb and forefinger.



### 5.3. MEASUREMENT OF BODY WEIGHT AND GROWTH

| Category 2 - low impact               |   |  |  |            |
|---------------------------------------|---|--|--|------------|
| Activity                              | Objective   | 3R activities  | Ratios   | References |
| Measurement of body weight and growth | To instruct students in the measurement of body weight and growth | Analysis of available datasets, theoretical learning, modelling, simulations, sampling | <b>Instructors:Students</b><br>1:30 instructing<br>1:30 supervising<br><b>Students:Animals</b><br>30:1 observing<br>1:1 performing |            |

Students observe the animals, noting details of their growth, weighing them and measuring body proportions. Prior training and experience in capture, restraint and handling must occur to ensure that the animals are restrained for the shortest possible period.

### 5.4. FOOD PALATABILITY INVESTIGATIONS

| Category 3 – moderate to high impact |   |  |   |   |
|--------------------------------------|---|--|---|---|
| Activity                             | Objective   | 3R activities                                | Ratios  | References  |
| Food palatability investigations     | To instruct students in palatability investigations | Theoretical learning, modelling, simulations | <b>Instructors:Students</b><br>1:30 instructing<br>1:30 supervising<br><b>Students:Animals</b><br>No ratio specified. | <a href="#">RSPCA – What should I feed my mice?</a> ;<br><a href="#">RSPCA – What should I feed my pet rat?</a> |

For small animals such as mice and rats, the only dietary effect that should be investigated is the palatability of different foods. As rats and mice are small in size, it is unacceptable to vary or restrict the quantity or quality of the feed provided.

### 5.5. DISSECTION – RATS OR MICE (PURCHASED DEAD AND PRESERVED)

| Category 3 – moderate impact |   |   |  |  |
|------------------------------|---|---|--|--|
| Activity                     | Objective   | 3R activities                                       | Ratios   | References                                   |
| Dissection                   | To instruct students in the dissection of rats or mice (purchased dead and preserved) | Step-by-step guides, modelling, videos, simulations | <b>Instructors:Students</b><br>1:30 instructing<br>1:30 supervising<br><b>Students:Animals</b><br>30:1 observing<br>3:1 performing | Procedure to be conducted as detailed below. |

#### DISSECTION PROCEDURE

Begin the dissection by placing the animal on its back and pinning it to the board through its feet.

Using large forceps lift the skin in the middle of the ventral (lower) surface of the animal. While the skin is held in this way, make a single cut.

Once an opening has been made, insert the closed, rounded end of the scissors into the opening and push the scissors forward in a mid-ventral line. This should separate the skin / fur from the underlying tissue.

Repeat the procedure in the other direction.

Pick up the skin of one side of the cut, insert the closed blunt end of the scissors and move it about to separate the skin from the body wall. Repeat for the other side. Cut and pin out the skin.

Now cut through the abdominal wall forward along the mid ventral line. Be careful not to cut too deep, as damage may result in the underlying organs. Take this cut as far as the rib cage. Now cut along the posterior border of the rib cage and pin out the flaps of the abdominal wall to either side.

#### INTERNAL INSPECTION

Identify internal organs, systems (digestive, respiratory and circulatory). Note observations and undertake sketches.

#### DISPOSAL

Upon completion of the dissection activity, all animals and tissue used in the experiment will be placed into plastic bags.

The plastic bags are sealed and stored in the freezer until the time of disposal.

All the plastic-encased animal tissue is placed in the garbage disposal service or medical disposal system used within the school site.

## SECTION 6 | GLOSSARY

|               |  |
|---------------|--|
| 3R activities | Animals used for teaching and training are not being used to discover, prove or develop new ideas and techniques but to communicate scientific concepts and to develop manual skills and expertise in specific techniques. 3R activities provide opportunities to communicate scientific concepts and develop technical skills and expertise, ensuring animals are used only when necessary and minimising the impact on animals used. |
| DAF           | Queensland Department of Agriculture and Fisheries   |
| QSAEC         | Queensland Schools Animal Ethics Committee   |
| Supervision   | Supervision in all instances means supervision by a suitably qualified person familiar with the procedures as well as normal and abnormal animal responses.  |
| The Code      | <a href="#">Australian code for the care and use of animals for scientific purposes 8<sup>th</sup> edition, 2013 (updated 2021)</a>  |

## SECTION 7 | REFERENCES

- Animals in Schools – Mice, NSW Department of Education, NSW Catholic Education Commission, Association of Independent Schools of NSW  
<http://nswschoolanimals.com/mice/>
- Animals in Schools – Rats, NSW Department of Education, NSW Catholic Education Commission, Association of Independent Schools of NSW  
<http://nswschoolanimals.com/rats/>
- Animal Welfare Victoria, Victoria Department of Jobs, Precincts and Regions – Caring for pet rats and mice  
<https://agriculture.vic.gov.au/livestock-and-animals/animal-welfare-victoria/other-pets/caring-for-pet-rats-and-mice>
- Australian and New Zealand Council for the Care of Animals in Research and Teaching  
<https://www.adelaide.edu.au/ANZCCART/resources/>
- Environmental enrichment for captive animals, Robert J. Young 2003, UFAW/Blackwell Publishing  
<http://www.federalcircusbill.org/wp-content/uploads/2014/04/Young20030001.pdf>
- Humane Endpoints – Pain associated behaviour in rats and mice  
<https://www.humane-endpoints.info/en/rat/pain-associated-behaviour>  
<https://www.humane-endpoints.info/en/mouse/pain-associated-behaviour>
- National Centre for the Replacement Refinement and Reduction of Animals in Research – Rat and mouse grimace scales
- <https://nc3rs.org.uk/3rs-resources/grimace-scales> NSW Department of Primary Industries – Guidelines for the housing of mice in scientific institutions  
[http://www.animaethics.org.au/\\_data/assets/pdf\\_file/0004/249898/Guideline-22-mouse-housing.pdf](http://www.animaethics.org.au/_data/assets/pdf_file/0004/249898/Guideline-22-mouse-housing.pdf)
- RSPCA – What should I feed my mice?  
<https://kb.rspca.org.au/knowledge-base/what-should-i-feed-my-mice/>
- RSPCA – What should I feed my pet rat?  
<https://kb.rspca.org.au/knowledge-base/what-should-i-feed-my-pet-rat/>
- Victorian Department of Primary Industries – Code of Practice for the Housing and Care of Laboratory Mice, Rats, Guinea Pigs and Rabbits  
[https://www.deakin.edu.au/\\_data/assets/pdf\\_file/0003/536628/620-codeofpractice-housing-and-care.pdf](https://www.deakin.edu.au/_data/assets/pdf_file/0003/536628/620-codeofpractice-housing-and-care.pdf)

## RATS AND MICE STANDARD OPERATING PROCEDURE

### APPLICATION/ACTIVITY NOTIFICATION FORM

|  |  |   |  |
|--|--|---|--|
| SCHOOL   |  |   |  |
| ACTIVITY LEADER'S NAME   |  |   |  |
| PHONE  |  | EMAIL   |  |
| SCHOOLING SECTOR/ SCIENTIFIC USER REGISTRATION NUMBER (ISSUED BY DAF)  |  |   |  |
| <input type="checkbox"/> STATE SCHOOL    SUR000102   |  | <input type="checkbox"/> QCEC   |  |
| ACTIVITY TITLE   |  |   |  |
| CURRICULUM REFERENCE<br>(PEDAGOGICAL JUSTIFICATION)  |  |   |  |
| YEAR LEVEL/S   |  | SPECIES OF ANIMAL/S   |  |
| ACTIVITY TYPE (TICK)   | <input type="checkbox"/> RAT/MICE DISSECTION<br><input type="checkbox"/> GROWTH & MEASUREMENT<br><input type="checkbox"/> BREEDING | DETAIL FATE PLANNING FOR LIVE ANIMAL ACTIVITY   |  |
| NUMBER OF ANIMALS<br>(MINIMUM RATIO IS 3 STUDENTS: 1 ANIMAL FOR RAT/MICE DISSECTION)   |  |   |  |
| DECLARATION BY THE ACTIVITY LEADER   |  |   |  |
| <p>I acknowledge that I am the teacher appointed/authorised teacher representative who will conduct this animal-use activity. In that capacity I agree that:</p> <ul style="list-style-type: none"> <li>• I and all others involved are familiar, and will comply, with the <a href="#">Animal Care and Protection Act 2001 (Qld)</a>, the <a href="#">Animal Care and Protection Regulation 2012 (Qld)</a> and the <a href="#">Australian code for the care and use of animals for scientific purposes, 8<sup>th</sup> edition 2013 (updated 2021)</a>.</li> <li>• I have read and understood <a href="#">Responsibilities of school personnel under the Code</a>.</li> <li>• No animal will be used in this activity except as described in this SOP and application.</li> <li>• Adequate resources will be available to undertake the project.</li> <li>• Health risks and infection controls have been considered and assessed.</li> <li>• All staff members and students involved in animal use activities are competent to perform the necessary tasks with care and knowledge of their ethical and legal responsibilities and the conditions imposed by the SOP.</li> <li>• <b>Unexpected adverse events will be reported within 7 days of occurrence as per the conditions described in this SOP.</b></li> </ul> <p>I agree that I have considered the 3Rs of animal welfare:</p> <ul style="list-style-type: none"> <li>• <b>replacement</b> of animals with other methods (alternatives)</li> <li>• <b>reduction</b> in numbers of animals used</li> <li>• <b>refinement</b> of techniques used, in order to reduce adverse impacts on animals.</li> </ul> |  |   |  |
| ACTIVITY LEADER'S SIGNATURE  |  |   |  |
| PRINCIPAL'S NAME   |  | <input type="checkbox"/> I have read and approved this application.<br><input type="checkbox"/> A record of this application will be held for 7 years for audit purposes. |  |
| PRINCIPAL'S SIGNATURE  |  |   |  |
| DATE   |  |   |  |

All fields must be complete before lodging this form.

Email this **signed Application/Activity notification form only** to [animal.ethics@qed.qld.gov.au](mailto:animal.ethics@qed.qld.gov.au).

Ensure that you keep a signed copy of this application on file in your school's animal register for auditing purposes.