

## Mice

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### Varietal range difference

There are over 330 species of mice in the world, but only the house mouse (*Mus musculus*) should be kept as a pet in Australia. There are over 40 different types of domestic house mouse and these display a wide variety of coat colours and fur types, including long hair and curly hair.

### Physical characteristics

<b>Size*</b>	overall length from nose to tail tip: 140mm - 180mm; approximate length from nose to tail base: 70mm - 90mm; approximate length of tail: 70mm - 90mm
<b>Weight*</b>	adult male: approximately 20g - 40g; adult female: approximately 18g - 35g
<b>Age at adult size</b>	10-12 weeks
<b>Average life span</b>	2 years; range 1-3 years; maximum reported 6 years
<b>Weight at birth</b>	1kg - 1.5kg
<b>Gestation period</b>	19-21 days
<b>Number of offspring</b>	4-14
<b>Weaning age</b>	21 days
<b>Range of breeding ages</b>	sexually mature from 5-7 weeks; female can have first oestrus cycle from 25-28 days; recommended breeding age 2.5-12 months; interval between births can be as short as 3.5-6 weeks
<b>Body temperature</b>	37.1°C - 37.4°C
<b>Heart rate</b>	310-840 beats/minute
<b>Respiration rate</b>	160 breaths/minute (94-163)

\*Some types of fancy mice can be heavier and larger than traditional pet house mice

## General biology

When caring for and developing comfortable housing for mice, it is important to consider the following:

- mice are social animals and can be kept in groups. Females will generally do well in single-sex groups, even when introduced together as adults. Male mice can be kept together if introduced at weaning and provided with enough room. Males will generally fight if placed together as adults. Males and females housed together are likely to breed quickly, often producing large litters;
- smell is very important to mice, so, when cleaning their housing or handling them, avoid generating strong odours such as those produced by deodorisers or perfumes. Ideally, mice should not be kept in the same environment/room as rats (which are natural predators of mice), as their odour can cause mice to exhibit fear/stress responses;
- mice are sensitive to sudden loud noises, so noise levels should be considered when deciding on cage placement;
- mice have good vision (similar to that of humans), but as they are predominately nocturnal, they avoid brightly-lit areas. Refuges, such as bedding and hiding places, should be provided in well-lit areas;
- touch is important to mice and they prefer contact with solid surfaces as opposed to wire floors and avoid open spaces. When travelling from one area to another, mice will remain in contact with the wall. The provision of dividers in their cages decreases fearful and anxious behaviour; and
- mice in the wild eat a wide range of foods and ideally pet mice fed a diet of commercial pellet food should be provided with a variety of supplementary foods.

## Normal behaviour

Healthy mice are alert, active and inquisitive. They have bright, clear, open eyes. Their ears stand up straight and their fur is dense and sleek. The behaviour of mice in a laboratory depends on how many are caged together, the size and type of cage, and the environmental conditions.

Mice are very agile acrobats and normal caged behaviour includes running, jumping, standing on their hind legs and climbing. They are social animals and should not be kept alone. If they are not being used for breeding, they should be placed in single-sex groups shortly after weaning.

Mice are nocturnal. They feed predominately at night and are far more active in low light, although they can have periods of activity at various times during the day. During daylight hours, it is normal behaviour for them to huddle together to conserve body heat. Healthy mice sleep in the foetal position and extension at rest is considered to be a sign of ill-health.

Some strains of mice are aggressive and are not suitable for use in the classroom. Most are not aggressive but will bite if frightened. Cannibalism is rare but it does occur, most commonly when nesting females are disturbed shortly after the young are born. It can also be an indication of inadequate diet or poor maintenance. Pregnant females show nest-building activity before giving birth and during lactation. During the breeding period, it is normal behaviour for males to nibble the females' heads or bodies and to examine their anogenital areas before copulation.

## Environment

Mice should not be housed with other species. They should be kept in stable groups of at least two animals to provide for social interaction. Cage designs vary and when selecting a cage it is important that it meet the standards required for safety, security, ease of cleaning and animal comfort and allow student observation. A cage or nesting place should be seen as the animals' home or domain and disturbed as little as possible. It must be remembered that the environmental requirements of small mammals are complex and imperfectly understood.

Pet shops can supply plastic cages or animals may be housed in unused aquariums with wire covers.

The minimum cage size for two or three mice is a height of 125 mm and floor area of 500cm<sup>2</sup> per pair or three. A suitable cage size for two mice is a length of 600mm, depth of 300mm, height of 250mm.

Mice are very active animals. They should be provided with exercise equipment such as running wheels. These must be of solid construction and not the wire-rung type, to minimise damage to the animals' legs and tails. Ropes, ladders, elevated boxes and tubes of cardboard or polycarbonate also provide good exercise facilities.

Mice prefer a temperature range of 19° C - 28° C and should be provided with good bedding and shelter during environmental extremes. Avoid large fluctuations in temperature.

Good natural lighting or artificial lighting of 60-400 lux should be provided. Cages should be kept out of direct sunlight and contain areas of shelter to which the mice can retire out of the light. Cycles of 12-14 hours of light and 12-10 hours of darkness are ideal.

Good, draught-free, natural ventilation is required. Mice should not be housed outdoors.

Litter should be non-toxic to mice, absorbent, not excessively dusty, economical and easily disposed of, inedible and uncontaminated by pesticides or chemicals. Suggested bedding materials include vermiculite, pelleted recycled paper, clean shredded paper, rice hulls or rice-based commercial litter.

Daily removal of droppings, soiled bedding and uneaten food is recommended. Cages should be cleaned thoroughly at least twice a week. Dirty bedding should be removed and disposed of and the cage washed with a suitable cleaner and dried thoroughly. New bedding should be supplied and the mice returned to the same cage in the same site, as change can induce stress in them.

Commercial nesting materials are available, but hay, straw, shredded paper, paper towel and paper tissues are also suitable. Avoid cottonwool, as this may trap newborns and cause injury.

## **Food and water**

Commercially-prepared mice pellets or cubes are recommended, as they provide a nutritionally-balanced diet. Refer to the manufacturer's instructions for quantities.

As a general guide, mice eat 15g of food per 100g of body weight, although this varies with their environment and physiological status. Lactating females need approximately four times the amount of food and water required by an adult mouse. Demand feeding often provides the best alternative, provided that the weight of the mice is monitored to ensure that there is no excessive gain. As mice prefer fresh food, it is better to purchase small amounts on a regular basis. Mice enjoy variety and their diet can be supplemented with small quantities of fresh fruit and vegetables as a daily treat.

Fresh, clean water must be provided at all times. An adult mouse needs about 4-7mL and a lactating female up to 14mL per day. As mice contaminate water in dishes and bowls, suspended water bottles with metal tubes are recommended.

The provision of a chewing block in the form of unpainted, untreated non toxic wood or commercially produced blocks will assist in the prevention of dental problems.

## **Handling**

Mice need to be handled calmly and with care to prevent distress and injury to the animals and their handlers. Mice should be conditioned to be handled from a young age so they are well prepared for handling by students. They are fragile and children must be supervised while handling them.

A mouse can be caught by the tail head (the part of the tail closest to its body). Hold the tail head between your thumb and finger and gently lift the mouse up so that the hind legs no longer touch the ground. A hand can then be slipped under the mouse and the animal placed gently onto the hand. Never

grasp a mouse by the tip or the middle of its tail. Tame mice can be scooped up smoothly onto the handler's hand without tail restraint.

## Disease prevention

Disease control methods and internal and external parasite control programs should be developed in consultation with veterinarians. All activities must be documented in the appropriate records.

## Signs of illness

The first sign noticed is often a change in the animal's natural demeanour: it may be listless or lethargic. Closer examination may show:

- a reluctance to move;
- an unkempt, erect coat;
- a discharge from the eyes, nose or 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 possible indication of weight loss;
- prostration or extension; or
- any lumps that could indicate possible growths or abscesses.

Mice with any of these symptoms should be isolated from the other animals immediately and their cages disinfected fully.

A failure to thrive or grow is another sign of illness.

If an animal shows signs of ill-health or distress, immediate veterinary advice should be sought.

Any illnesses or injuries and the treatment given should be documented in the appropriate records, including the SAEC's [Form C1](#).

## Euthanasia

In the case of a mouse becoming so sick, diseased or injured that recovery is unlikely or undesirable, on humane grounds euthanasia must be arranged with a veterinarian or a person competent in the technique for mice.

A record of deaths is required for the annual report, [Form D](#), to SAEC and all deaths resulting from unexpected or adverse events must be reported immediately to the SAEC using [Form C1](#) and [Form C2](#).

## Fate planning

A fate plan should be considered before using a mouse in any program. Mice that are no longer required must be re-homed.

## Further information

Relevant websites include:

- [American Society for the Prevention of Cruelty to Animals](#)

- [Australian and New Zealand Council for the Care of Animals in Research and Teaching](#)
- [RSPCA UK](#)
- [Universities Federation for Animal Welfare](#)

Relevant texts include:

- McGreevy, P. (2002). Handle with Care. Sydney: Halstead Press.
- Snowball, Dianne (1989). Care for your Pet: an official RSPCA publication. Malvern, Victoria: Snowball Educational Publications.
- Universities Federation for Animal Welfare (1999). UFAW Handbook on the Care and Management of Laboratory Animals, 7th ed. Oxford: Blackwell.