

STANDARD OPERATING PROCEDURE

ENVIRONMENTAL ENRICHMENT FOR ANIMALS USED IN RESEARCH AND TEACHING

- 1.0 PURPOSE:** This SOP describes the methods for environmental enrichment of animals used for research and teaching purposes. These methods are intended to improve the well-being of these animals by increasing species-specific behaviors and reducing maladaptive behaviors. This program helps meet the requirements of the National Research Council, *Guide for the Care and Use of Laboratory Animals* (<http://www.nap.edu/readingroom/books/labrats/>) and the Animal Welfare Act and Regulations: Public Law 99-198 – The Improved Standards for Laboratory Animal Act (<http://www.nal.usda.gov/awic/legislat/awa.htm>).
- 2.0 STANDARDS:**
- 2.1 Items that may be used for enrichment need to be evaluated for use by taking into account the following:
- 2.1.1 The species of animal (its needs, habits, and capabilities)
 - 2.1.2 The type of enrichment device (treat, exercise, toys)
 - 2.1.3 The utility of the device (its ability to stimulate the animal's interest)
 - 2.1.4 The safety of the device (not injurious to the animal and its ability to be sanitized for future use)
 - 2.1.5 The nature of the research being done (research will not be compromised due to placement of an enrichment device)
- 2.2 The enrichment program is carried out by University Research Animal Resources (URAR). Specific needs and requirements should be communicated to the Assistant Director of the Animal Resources (AR) Unit.
- 2.3 Unless specifically justified by the primary investigator in the Animal Use Proposal (AUP), all animals will receive enrichment. It is recognized that animal enrichment can be a research variable.
- 2.4 Enrichment is an integral part of the daily husbandry and care of animals.
- 2.5 Positive non-husbandry interaction with humans should be offered as applicable.
- 2.6 For social species, housing compatible co specific offers a high level of enrichment. Every effort should be made to socially house animals as the enrichment technique of first choice.
- 2.7 For burrowing rodent species, housing in a solid bottomed cage with a loose bedding substrate is a preferred enrichment technique.
- 2.8 The Animal Care Staff will record on the ANIMAL ROOM LOG (ARL, refer to *SOP 04.002*, "documentation of Animal Room Logs") when enrichment is provided.
- 3.0 PROCEDURES:**
- 3.1 **Animals will be provided with at least one enrichment item unless noted (primates) from the following options. Other enrichment may be provided on a trial basis.**
- 3.2 **Mice (*Mus musculus*)**
- 3.2.1 Nesting material (Nestlets, paper towels, etc.)
 - 3.2.2 Food treats mixed with bedding (e.g., 1 dry-roasted, unsalted peanut/mouse/week; 3—4 unsalted sunflower seeds/animal/week)
 - 3.2.3 Paper tubes (purpose made from specialty paper manufacturers)

- 3.2.4 Nylabones
- 3.2.5 Mouse houses (Paper or plastic)

3.3 SCID/Nude mice (or others in which sterile technique is utilized)

- 3.3.1 **ALL ENRICHMENT MATERIALS MUST BE AUTOCLAVED IN THE CAGE UNIT SET-UPS.**
- 3.3.2 Food treats mixed with bedding (e.g., 1 dry-roasted, unsalted peanut/mouse/week; 3—4 unsalted sunflower seeds/animal/week)
- 3.3.3 Nesting material (Neslets, paper towels, etc.)
- 3.3.4 Nylabones
- 3.3.5 Mouse houses (Paper or plastic)

3.4 Rats (*Rattus norvegicus*)

- 3.4.1 Paper tube or PVC tube of appropriate size
- 3.4.2 Nesting material (Neslets, paper towels, etc.)
- 3.4.3 Food treats (e.g., 2 dry-roasted, unsalted peanuts/rat/week; 6-8 unsalted sunflower seeds/rat/week)
- 3.4.4 Nylabones

3.5 Gerbils (*Meriones unguiculatus*)

- 3.5.1 Paper or PVC tube
- 3.5.2 Nesting material (Neslets, paper towels, etc.)
- 3.5.3 Food treats (e.g., 1 dry-roasted, unsalted peanut/gerbil/week; 3-4 unsalted sunflower seeds/gerbil/week)
- 3.5.4 Nylabones

3.6 Hamsters (*Mesocricetus auratus*)

- 3.6.1 Paper or PVC tube
- 3.6.2 Nesting material (Neslets, paper towels, etc.)
- 3.6.3 Food treats (e.g., 1 dry-roasted, unsalted peanut/hamster/week; 3-4 unsalted sunflower seeds/hamster/week)
- 3.6.4 Nylabones

3.7 Guinea Pigs (*Cavia porcellus*)

- 3.7.1 Nylabones
- 3.7.2 PVC tube

3.8 Rabbits (*Oryctolagus cuniculus*)

- 3.8.1 Fruits and vegetables (washed in 5% bleach solution)
 - 3.8.1.1 Sliced apples
 - 3.8.1.2 Cabbage leaves
 - 3.8.1.3 Carrots
- 3.8.2 Hay in cage (autoclaved)

- 3.8.3 Nest box
- 3.8.4 Bunny ball
- 3.8.5 Carrot Nylabone
- 3.8.6 Bells attached to a chain
- 3.8.7 Soft wood blocks
- 3.8.8 Small plastic bottles (soda size) emptied and rinsed

3.9 Cats: (*Felis catus*)

- 3.9.1 Canned cat food
- 3.9.2 Hammock (soft bed)
- 3.9.3 Cardboard box or empty feed bag to play in
- 3.9.4 Scratch board
- 3.9.5 Pair housing
- 3.9.6 Group play time in animal room
- 3.9.7 Suspended toys

3.10 Dogs: (*Canis familiaris*)

- 3.10.1 Group housing to allow visual, auditory and olfactory contact with animals
- 3.10.2 Nylabones
- 3.10.3 Kong™ chew toys
- 3.10.4 Hard Plastic balls

3.11 Birds (*Psitticines*):

- 3.11.1 Treats (size of nut or fruit is proportionate to the size of the bird). At least one unsalted nut or small chunk of sliced fruit is given to each bird each day.
 - 3.11.1.1 Unsalted mixed nuts
 - 3.11.1.2 Sliced apples
 - 3.11.1.3 Sliced pears
 - 3.11.1.4 Diced melons

- 3.11.2 Toys (perches, cuttle bones, etc.)

3.12 Frogs

- 3.12.1 Housed in compatible groups
- 3.12.2 PVC tubes of appropriate size
- 3.12.3 Hides and shelters

3.13 Fish

- 3.13.1 House in compatible groups
- 3.13.2 PVC tubes of appropriate size

3.14 Non-Human Primates

3.14.1 Daily Enrichment

3.14.1.1 Animals will be pair housed and observed by Animal resources Staff for compatibility. Animals showing signs of distress including weigh loss, fighting, and depression will be separated and evaluated by Animal Resources Staff for compatibility. Each animal has visual, auditory and olfactory contact with animals similarly housed in the room.

3.14.1.2 Each animal has unlimited tactile contact with at least one other animal.

3.14.1.3 Toys, chains and treats are offered to each animal daily.

3.14.1.4 An assortment of fresh fruits and nuts or seeds is offered to each animal daily not to exceed ten percent of total diet.

3.14.1.4.1 All food items stored in any Animal Resources maintained food storage facility which houses enrichment food items must be properly stored to prevent contamination or infestation of enrichment food items.

3.14.1.4.2 Refrigerators should be utilized for fruits, vegetables, seeds or commercial foods specifying refrigeration as the proper storage method.

3.14.1.4.3 Freezers should be utilized for popsicles and other foods specifying freezing as the proper storage method.

3.14.1.4.4 Food items that are not placed in a refrigerator or freezer must be paced in containers that have an airtight sea to prevent contamination or infestation.

3.14.1.5 Enrichment activities are recorded on a log sheet. Activities are listed on bottom of log, choose from the following.

3.14.1.5.1 Category A: direct visual contact, olfactory contact, auditory contact, perches, plastic chain, fruit/vegetable assortment, plastic toys

3.14.1.5.2 Category B: PVC ring, Kong toys, prima treat, seeds/nuts

3.14.1.5.3 Category C: puzzle feeder

3.14.1.5.4 Category D: frozen popsicles

3.15 Horses (*Equus caballus*):

3.15.1 House in pastures in compatible groups

3.15.2 Groom and rub

3.15.3 Hang empty gallon milk jugs in stalls

3.15.4 Stall horses so they can see each other

3.15.5 Play a radio in the barn

3.15.6 Horses on long-term studies can be hand grazed if permitted by researcher

3.15.7 Food treats

3.15.7.1 Apples

3.15.7.2 Carrots

3.15.7.3 Alfalfa cubes; feed more often (3X daily)

3.16 Cattle (*Bos taurus*):

- 3.16.1 House in compatible groups
- 3.16.2 Provide supplemental feed minimum of twice a week
- 3.16.3 Allow access to post or structure in fence to scratch/rub on
- 3.16.4 Give stalled cattle a scoop of sweet feed twice daily

3.17 Pigs (*Sus scrofa*):

- 3.17.1 House in compatible groups
- 3.17.2 Provide toys
 - 3.17.2.1 Basketballs
 - 3.17.2.2 Bowling balls
 - 3.17.2.3 Kong™ toys
- 3.17.3 Hang empty milk jugs, hoses, cloth strips
- 3.17.4 Hand feed food treats

3.18 Goats (*Capra hircus*):

- 3.18.1 House in compatible groups
- 3.18.2 Place feed tub upside down to climb on

3.19 Fawns/Deer (*Odocoileus virginianus*)

- 3.19.1 House in compatible groups
- 3.19.2 Provide mini salt lick

3.20 Raccoons (*Procyon lotor*)

- 3.20.1 House in compatible groups
- 3.20.2 Provide toys
 - 3.20.2.1 Plastic balls
 - 3.20.2.2 Kong toys
- 3.20.3 Food treats
 - 3.20.3.1 Sliced Apples
 - 3.20.3.2 Sliced Pears
- 3.20.4 Provide hide or cover (e.g. cat carrier, sky kennel)

6.0 RECORDS: The Animal Care Staff will check (√) off daily on the ARL when environmental enrichment item or technique is provided (refer to *SOP 04.002*).

7.0 DEFINITIONS AND REFERENCES:

7.1 Definitions:

- 7.1.1 Animal Use Proposal (AUP): a detailed written description of the procedures involving the use of animals in a research project.
- 7.1.2 Enrichment: a method of providing animals with the opportunity to behave as they do in the wild, playing, foraging, grooming, and interacting in other ways with one another.
- 7.1.3 Principal Investigator (PI): the scientist who plans and coordinates all phases of the research work and the research protocol.

7.2 References:

- SOP 04.002, "documentation of Animal Room Logs"*
National Research Council, *Guide for the Care and Use of Laboratory Animals*
(<http://www.nap.edu/readingroom/books/labrats/>)
Animal Welfare Act and Regulations: Public Law 99-198 – The Improved Standards for Laboratory Animal Act (<http://www.nal.usda.gov/awic/legislat/awa.htm>)