

Guidelines for General Species Environmental Enrichment

Overview:

In accordance with the *Guide for the Care and Use of Laboratory Animals (Guide)*, research facilities must provide appropriate environmental enrichment for all laboratory animals to improve their well-being. The principal goal of environmental enrichment is to improve an animal’s quality of life. This is done by giving them opportunities for sensory and motor stimulation. These opportunities come from providing structures and resources that promote psychological wellbeing through physical exercise and engaging in activities that are appropriate with their species.(1)

Environmental enrichment should be applied consistently throughout an animal program. When discussing the humane care and use of animals with stakeholders, it is important to discuss a balance between animal welfare and the objectives of the biomedical research.(2) The Animal Care and Use Committee (ACUC), researchers, and veterinarians should review regularly to ensure they are effective and align with research goals.(1) This document provides the NIH Intramural Research Program (IRP) with an environmental enrichment framework for each Institute/Center (IC) to utilize in order to develop their own plans. For USDA-regulated species, lead ICs will develop plans as specified in the Animal Welfare Act and Regulations (AWAR).(3)

Three appendices accompany this document for additional specific guidance regarding enrichment recommendations: [Appendix 1: Environmental Enrichment of Rodents](#), [Appendix 2: Behavioral Management of Nonhuman Primates](#), and [Appendix 3: Environmental Enrichment for Aquatic Species](#).

General:

An integrated approach to behavioral management should involve animal facility personnel to include veterinary, animal care, facility management, behavioral staff, and researchers. Personnel involved in behavioral management should understand the “General Indicators of Well-being” for species involved (Table 1).(4-6) Well-being, or animal welfare, refers to an animal's condition or the treatment it receives to meet both physical and mental needs.

Table 1: General Indicators of Well-Being:

Physical Well-Being	Psychological Well-Being
<ul style="list-style-type: none">• Freedom from disease, illness and injury• Body weight maintenance and food/water consumption• Healthy hair coat	<ul style="list-style-type: none">• Displaying a range of species-typical behavior• Low levels of aberrant behavior• Appropriate response to challenges or stressors• Ability to cope with daily changes in social and physical environment• Presence of balanced temperament• Absence of chronic signs of pain or distress

A **behavioral management program** should include improvements to animal care, known as husbandry refinements. The refinements consist of four overlapping areas (Table 2: Husbandry Refinements): environmental enrichment, socialization of social species, behavior assessment, and positive reinforcement training (PRT). The behavior management program should also select the appropriate types of environmental enrichment (Table 3: Types of Enrichment).(7-11)

Table 2: Benefits of Husbandry Refinements

Environmental Enrichment/Improvements	Socialization of Social Species
<ul style="list-style-type: none"> • Promote species specific behavior (i.e., social housing) • Promote psychologic well-being (i.e., objects for manipulation) • Increases behavioral choice (i.e., objects to hide) • Promote foraging behavior** • Promote environmental ecology** 	<ul style="list-style-type: none"> • Promote species specific behavior • Promote psychologic well-being • May increase ability to cope more easily • Reduces abnormal behaviors • Increases locomotion • When implementing should understand social system
Behavioral Assessment	Positive Reinforcement Training (PRT)
<ul style="list-style-type: none"> • Observing animal behaviors with people and cohorts • Identifying abnormal behaviors • Treating abnormal behaviors 	<ul style="list-style-type: none"> • Facilitates husbandry, veterinary and research procedures • Reduces behavioral problems • Increases efficiency • Reduces stress • Improves well-being <ol style="list-style-type: none"> 1) Provides “options” 2) Provides ways to cope with stressors 3) Provides opportunity for the animal to have some control 4) Provides the animal with a job 5) Promotes exercise 6) Provides mental stimulation
<p><i>** Critical part of enrichment plan and should be based on the natural histories and normal specific species behavior</i></p>	

Table 3: Types of Enrichment

Social Enrichment	Environment Improvement
<ul style="list-style-type: none"> • Types of Social Enrichment <ol style="list-style-type: none"> 1) Sensory contact (visual, auditory, olfactory) 2) Partial contact with individuals (grooming panels, intermittent social access) 3) Continuous unrestricted pair or group housing 4) Positive interactions with humans where appropriate by species • Considerations for social enrichment <ol style="list-style-type: none"> 1) Species 2) Individual animals' previous social histories 3) Study limitations 4) Housing limitations 5) Risk assessment 6) Plan of action when fighting occurs 	<ul style="list-style-type: none"> • Varied substrate bedding and foraging material • Raised surfaces • Visual blocks • Nest boxes, huts, tubes, gnawing devices • Swings • Changing size and complexity of the enclosure • Manipulanda, toys, puzzle feeders, grooming boards, climbing structures, running wheels
Nutritional Enrichment	Sensory Enrichment
<ul style="list-style-type: none"> • Novel delivery of food • Foraging opportunities - in their natural environments, most laboratory species spend most of their waking hours foraging for a variety of foods • Types of Novel foods <ol style="list-style-type: none"> 1) Foods that are time-consuming 2) Foods that are highly desirable 	<ul style="list-style-type: none"> • Visual - television, windows, bubbles, people watching, mirrors • Olfactory - scented sprays, herbs • Auditory - radio, people talking to the animals • Tactile – frozen treats, varied nesting or foraging material
Occupational Enrichment	
<ul style="list-style-type: none"> • Puzzle feeders • Manipulanda • Positive reinforcement training (PRT) • Nest building 	

Documentation of the Enrichment Program:

The documentation requirements for the appropriate exercise for dogs and provisions for environmental enhancements adequate to promote the psychological well-being of non-human primates are described in the USDA Animal Welfare Act and Animal Welfare Regulations, Title 9 CFR, Chapter 1, Subchapter A – Animal Welfare (<https://www.ecfr.gov/current/title-9>).(12)

Enrichment programs and plans for non-USDA-regulated species should be documented according to facility specific standard operating procedures.

References:

1. National Research Council. Guide for the Care and Use of Laboratory Animals: Eighth Edition. Washington, DC: The National Academies Press; 2011. 246 p.
2. Weed JL, Raber JM. Balancing animal research with animal well-being: establishment of goals and harmonization of approaches. *Ilar j.* 2005;46(2):118-28.
3. United States Department of Agriculture. USDA Blue Book: Animal Welfare Act and Animal Welfare Regulations USDA2022 [Available from: <https://www.aphis.usda.gov/media/document/17164/file>].
4. Novak MA, Suomi SJ. Psychological well-being of primates in captivity. *Am Psychol.* 1988;43(10):765-73.
5. Dawkins M. *The Science of Animal Welfare: Understanding What Animals Want.* 2021.
6. National Centre for the Replacement Refinement & Reduction of Animals in Research. Welfare assessment 2014 [Available from: <https://nc3rs.org.uk/3rs-resources/welfare-assessment>].
7. Lutz CK, Novak MA. Environmental enrichment for nonhuman primates: theory and application. *Ilar j.* 2005;46(2):178-91.
8. Reinhardt V, and Reinhardt, A. *Environmental Enrichment for Primates:* Animal Welfare Institute; 2008.
9. National Centre for the Replacement Refinement & Reduction of Animals in Research. Choosing appropriate enrichment 2021 [Available from: <https://nc3rs.org.uk/3rs-resource-library/evaluating-environmental-enrichment/choosing-appropriate-enrichment>].
10. American Society of Primatologists. Introduction to environmental enrichment for primates [Available from: <https://asp.org/welfare/environmental-enrichment/>].
11. Office of Laboratory Animal Welfare. Enrichment and Social Housing Resources 2026 [Available from: <https://grants.nih.gov/policy-and-compliance/policy-topics/animal-welfare/compliance-topics/enrichment-social-housing-resources#nonhuman-primates>].
12. Office of the Federal Register. Title 9 Code of Federal Regulations, Chapter 1, Subchapter A – Animal Welfare 2025 [Available from: <https://www.ecfr.gov/current/title-9/chapter-I/subchapter-A>].

Approved – 12/11/2013

Revised - 03/22/2017, 2/19/2019, 05/24/2023, 06/24/2026