ACLAM Test Template

Below is the test template for the ACLAM Examination. This document is based on the Role Delineation Document developed approved by the ACLAM Board of Directors in June 2024. The Test Template was approved by the ACLAM Board of Directors in November 2024. The content portion of the examination is organized into six domains. Each domain contains tasks deemed important by the RDD task force based on the Role Delineation Survey results. These tasks provide the context for the knowledge topics to be tested. The Test Template Panel reviewed each of the knowledge statements in the RDD and identified the knowledge statements included in this document as those that are to be tested. Note: In order to simplify the classification of test items, the knowledge statements have been identified with the code Test Template Domain Number. Unique Number (e.g., TT1.1)

The percentage of test questions assigned to each Domain will serve as the guide for the creation of each of the examinations. The final number of items with each form will be within ± 1 percent.

		Percent of Test
Domain 1: Management of Spontaneous and Experimentally Induced Diseases and Conditions		**25%**
Tasks	*Knowledge Topics*	
T1. Prevent spontaneous or unintended disease or condition. T2. Control spontaneous or unintended disease or condition. T3. Diagnose disease or condition as appropriate. T4. Treat disease or condition as appropriate.	TT1.1. Diagnostic procedures: a. Conduct of a physical examination. b. Clinical pathology [e.g., hematology (CBC); clinical chemistries and urinalysis]. c. Gross necropsy techniques with appropriate recognition of lesions and sampling to facilitate histopathologic and other diagnostic evaluation. d. Other diagnostic procedures (e.g., imaging techniques; EKG).	
	TT1.2. Surgical techniques associated with diagnostic (e.g., exploratory; biopsy) and therapeutic (e.g., tumor removal) surgeries.	
	TT1.3. Immunobiology (e.g., antibody responses; cellular immunity; species-specific immune responses).	
	TT1.4. Nutrition with emphasis on effects of deficiency or toxicity.	
	TT1.5. Anatomy with emphasis on features which have significance with regard to clinical medicine (e.g., rat Harderian gland) or experimental medicine (e.g., coronary artery anatomy of the pig, which allows use for induced infarcts; Circle of Willis anatomy in gerbils, which allows use in stroke models).	
	TT1.6. Physiology with emphasis on normative data and characteristics (e.g., seasonal changes in squirrel monkeys; coprophagia in rabbits), metabolic differences (e.g., hypoglycemia in squirrel monkeys) or metabolism of induced	

	disease (e.g., streptozotocin-induced diabetes mellitus), reproductive physiology, and clinically significant physiological features.	
	TT1.7. Parasitology with emphasis on parasitic diseases that can become established in a colony and zoonotic parasitic diseases.	
	TT1.8. Microbiology with emphasis on organisms of clinical significance; subclinical infections that cause physiologic, biochemical, and/or immunologic alterations; zoonotic disease organisms; organisms used experimentally to induce infection and unintended infections (e.g., infections associated with chronic vascular cannulation); and sampling and culture techniques for such organisms.	
	TT1.9. Anatomic pathology including pathogenesis of significant naturally occurring (e.g. tuberculosis) and experimentally induced (e.g. collagen induced arthritis) diseases; typical gross and histopathologic lesions (e.g., age-related changes, or pathologic changes of adverse phenotypes associated with genetically modified rodents); and pertinent anatomic pathology techniques (e.g., Steiner's stain).	
	TT1.10. Pharmacology with emphasis on drugs used to treat spontaneous or induced disease (e.g., indications, use and contraindications of drugs; adverse reactions; adverse interactions; mechanisms of action; species-specific toxicity), and drugs used to induce disease [e.g., streptozotocin to induce diabetes, azoxymethane to induce neoplasia, or Dextran sulfate sodium (DSS) to induce colitis].	
	TT1.11. Epidemiology including species-specific susceptibility to induced disease (e.g., modes of disease transmission; latency; persistence; prevalence; incidence).	
	TT1.12. Preventive medicine (e.g., immunization; quarantine; prescreening tests).	
	TT1.13. Diagnostic procedures: a. Species-specific behavioral assessment. b. Serologic, cytologic, and molecular diagnostic tests (e.g., PCR; ELISA; IFA; HAI; Western blot) and proper sampling techniques.	
	TT1.14. Genetics with emphasis on control and treatment of naturally occurring and experimentally induced disease, predisposition to disease, and modes of inheritance.	

Domain 2: Management of Pain and Distress		**10%**
Tasks	*Knowledge Topics*	
T1. Recognize pain and/or distress.	TT2.1. Anatomy and physiology of pain and distress.	
T2. Minimize or eliminate pain and/or distress.	TT2.2. Patient monitoring.	
T3. Administration of anesthesia and analgesia.	TT2.3. critical and post-procedural care techniques.	
T4. Euthanasia.	TT2.4. Assessment of pain and distress (e.g., behavior which is a sign of pain and/or distress; physiologic changes; pain and distress scoring systems).	
	TT2.5. Causes of pain.	
	TT2.6. Causes of distress.	
	TT2.7. Effects of pain and distress on normative physiology and on research studies.	
	TT2.8. Pharmacological interventions for pain and distress and their effects on physiology, including age and species differences for such interventions, and depth and duration of analgesia provided by such interventions.	
	TT2.9. Non-pharmacological interventions for pain and distress and their effects on physiology, including age and species differences for such interventions.	
	TT2.10. Euthanasia.	
	TT2.11. Humane endpoint criteria.	

Domain 3: Research		**20%**
Tasks	*Knowledge Topics*	
T1. Facilitate or provide research support.	TT3.1. Biomethodology techniques (e.g., collection of blood and other body fluids and tissues; handling and restraint; administration of compounds and treatments).	
T2. Advise and consult with investigators on matters related to their research and the construction of their animal use protocol.	TT3.2. Research methods and equipment (e.g., antibody production; adjuvants; tumor induction; imaging; data collection techniques such as telemetry; observation; behavioral assessment methods).	
T3. Design and conduct research.	TT3.3. Animal models (spontaneous and induced) including normative biology relevant to the research (e.g., background lesions of common strains).	
	TT3.4. Genetics and nomenclature.	
	TT3.5. Genetic modification/engineering technology including application of molecular biology techniques.	
	TT3.6. Characterization of animal models (e.g., phenotyping, behavioral assessment).	
	TT3.7. Gnotobiotics.	
	TT3.8. Experimental surgical techniques and instrumentation.	
	TT3.9. Understand the principles of experimental design and statistics. To include the appropriate use of the scientific method, the selection of appropriate sample (sensitivity, specificity, negative predictive values, and positive predictive values).	
	TT3.10. Information resources (e.g., National Agricultural Library; National Library of Medicine).	
	TT3.11. Scientific writing.	
	TT3.12. Replacement, Reduction and Refinement techniques.	
	TT3.13. Effective methods for communicating research-related concerns.	
	TT3.14. Aseptic requirements for performing surgery.	
	TT3.15. Genomics, metabolomics, and proteomics.	

Domain 4: Animal Care		24%
Tasks	*Knowledge Topics*	
T1. Develop animal husbandry programs.	TT4.1. Species-specific husbandry (e.g., nutrition, housing, exercise).	
T2. Manage or provide indirect management/ oversight of animal husbandry programs.	TT4.2. Environmental enrichment, species-appropriate behavioral and psychosocial needs including creation and maintenance of appropriate social pairs or groups.	
T3. Manage or provide indirect management/ oversight of laboratory animal facilities.	TT4.3. Methods of sterilization, sanitation, and decontamination.	
	TT4.4. Quality assurance techniques for animal care-related equipment (e.g., verification of effective cage sanitation) and supplies (e.g., water, food, bedding).	
	TT4.5. Animal procurement considerations (including sources, vendor surveillance, genetic monitoring, transportation).	
	TT4.6. Breeding colony management (e.g., systems and records, genetic monitoring).	
	TT4.7. Animal identification systems.	
	TT4.8. Pest control (e.g., methods, hazards and toxicity).	
	TT4.9. Pathogen-free barriers (exclusion), maintenance of pathogen-free colonies via comprehensive sentinel/health monitoring program, sentinel-free surveillance programs (soiled bedding media or swabs).	
	TT4.10. Containment facilities (inclusion).	
	TT4.11. Environmental causes of physiological alterations in animals and their effects on research (e.g., sound, light, temperature, humidity, housing systems).	
	TT4.12. Environmental monitoring (e.g., water testing).	
	TT4.13. Watering and feeding (e.g., automated watering, liquid diets, ad lib or restricted diets).	
	TT4.14. Disaster planning.	
	TT4.15. Housing systems (e.g., aquatics; rodent high-density housing; NHP caging; disposable caging).	

Domain 5: Regulatory Responsibilities		19%
Tasks	*Knowledge Topics*	
T1. Perform direct or delegated Attending Veterinarian responsibilities.	TT5.1. Laws, regulations, policies and standards:	
T2. Advocate for humane care and use of animals.	a. Controlled Substances Act/DEA Regulations.	
T3. Provide advice to occupational health and safety programs.	b. AAALAC Position Statements	
T4. Provide advice on biological, chemical and radiation hazards in an animal research program.	c. Animal Welfare Act and Animal Welfare Regulations (USDA)	
	d. AVMA Guidelines for the Depopulation of Animals	
	e. AVMA Guidelines for the Euthanasia of Animals	
T5. Serve as a member of an IACUC or consistently attend/participate in IACUC meetings.	f. Biosafety in Microbiological and Biomedical Laboratories (CDC/NIH)	
	g. Drug Enforcement Administration. 21 CFR (Food and Drugs), Chapter 2, Sections 1304 "General Information" and "Inventory Requirements" (1304.01-1304.11); 1305 Subpart B (1305.11-1305.20); and 1308 "Schedules" (1308.11-1308.15)	
T6. Review protocols and provide advice to investigators and the IACUC.	h. Endangered Species Act/CITES	
	i. Good Laboratory Practices (FDA/EPA)	
	j. Guide for the Care and Use of Agricultural Animals in Research and Teaching (FASS)	
	k. Guide for the Care and Use of Laboratory Animals (ILAR/NRC)	
	l. Guidelines for the Care and Use of Mammals in Neuroscience and Behavioral Research	
	m. Health Research Extension Act, Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals, OLAW interpretive guidance (FAQs)	
	n. Live Animals Regulations (IATA – International Air Transportation Association)	
	o. NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules (NIH Guidelines) and Office of Science Policy (NIH)	
	p. Occupational Health and Safety in the Care and Use of Nonhuman Primates	
	q. Occupational Health and Safety in the Care and Use of Research	

	Animals (ILAR/NRC)	
	r. Select Agents and Toxins	
	s. USDA and CDC animal importation regulations	
	TT5.2. Role and function of the IACUC.	
	TT5.3. Protocol review.	
	TT5.4. Facility inspection and program review.	
	TT5.5. Occupational health and safety (e.g., ergonomics; OSHA; allergens; blood-borne pathogens; radiation and chemical hazards; SDS).	
	TT5.6. Role and function of the Institutional Biosafety Committee (IBC).	
	TT5.7. Role and function of AAALAC International.	
	TT5.8. Responsible conduct of research.	

Domain 6: Education		**2%**
Tasks	*Knowledge Topics*	
T1. Train personnel in animal care and use.	TT6.1. Train personnel in animal care and use.	
T2. Maintain current knowledge and continued competence in laboratory animal medicine.	TT6.2. Maintain current knowledge and continued competence in laboratory animal medicine.	
	TT6.3. Educational resources (e.g., publications; inanimate models; computer applications; conferences).	
	TT6.4. Certification programs (e.g., AALAS technician certification program; ACLAM certification).	
	TT6.5. Societal issues involving use of animals: a. Organizations related to and/or supportive of laboratory animal medicine and animal research (e.g., AALAS, ASLAP, ILAR, NABR, AMP). b. Organizations opposed to animal research (e.g., PETA, HSUS, WCW) including their philosophy and opposition strategies. c. Philosophy and ethics of animal use. d. History and value of animal research.	

ACLAM Test Template

Species

For purposes of the test, an item that requires knowledge of the specific species to answer it correctly will be classified as a species item. The species may be identified by its common name or its binomial name.

	Percentage Range
Primary Species	60 - 70 %
Mouse (*Mus musculus*)	
Rat (*Rattus norvegicus*)	
Rabbit (*Oryctolagus cuniculus*)	
Macaques (*Macaca* spp).	
Dog (*Canis familiaris*)	
Pig (*Sus scrofa*)	
Zebrafish (*Danio rerio*)	
Secondary Species	18 - 28 %
African clawed frog (*Xenopus* spp.)	
Guinea pig (*Cavia porcellus*)	
Ferret (*Mustela putorius furo*)	
Squirrel monkey (*Saimiri sciureus*)	
Sheep (*Ovis aries*)	
Syrian hamster (*Mesocricetus auratus*)	
Baboon (*Papio* spp.)	
Marmoset/tamarins (*Callitrichidae*)	
Gerbil (*Meriones* spp.)	
Goat (*Capra hircus*)	
Tertiary Species	7 - 17%
Other rodents	
Chicken (*Gallus domestica*)	
Other nonhuman primates	
Other mammals	
Pigeon (*Columbia livia*)	
Other amphibians	
Other livestock species including cattle and horses	
Other fish	
Reptiles	
Other birds	
Cephalopods and Other Invertebrates	
Cat *(Felis domestica*)	