Animal ethical guidelines

Lesson 2.4.2 | AS research methodology

Core ideas

Animal research must balance possible scientific or practical value against harm to the animals involved.

Replacement means using a non-animal method where a suitable alternative exists.

Reduction means using the fewest animals needed to answer the research question properly.

Refinement means improving housing, handling and procedures to reduce pain, stress or restriction.

Researchers should consider species-specific needs, including social behaviour, diet, space and enrichment.

Ethical evaluation should include welfare, consent limitations, procedure severity, long-term effects and whether the findings justify the cost.

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Key terms

Animal welfare: The physical and psychological well-being of an animal.

Replacement: Using non-animal alternatives where possible.

Reduction: Using the fewest animals needed for useful evidence.

Refinement: Changing procedures or care to reduce harm and improve welfare.

Species-specific need: A requirement linked to the natural behaviour or biology of a species.

Enrichment: Features that support natural behaviour and stimulation.

Procedure severity: How much pain, stress or restriction a procedure may cause.

Scientific value: The usefulness of research for knowledge or practical benefit.

Further detail and evidence

The 2027 animal-ethics checklist explicitly includes replacement, suitability of species, the number of animals, and procedures covering pain/suffering/distress, housing, rewards, deprivation and aversive stimuli. Judge these against the scientific value and minimisation of harm.

The official checklist includes harm/benefit, replacement, species, numbers and procedures. Procedures include pain/suffering/distress, housing, rewards, deprivation and aversive stimuli. Reduction/refinement are useful supporting ideas, but do not replace the explicit checklist.

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Applying the ideas

Hassett maintained group housing and normal provisioning, but toy damage required monitoring. Fagen used rewards without adding aversive training in sessions, while pre-existing chains restricted movement. An animal's ability to turn away matters, but is not informed human consent.

Worked example: A researcher wants to study learning in animals. Which two of the 3Rs should shape the plan? Replacement should be considered first, because the researcher should ask whether a simulation, existing data or non-animal method could answer the question. Reduction should also shape the plan by using only the number of animals needed for reliable evidence. Together, these principles reduce unnecessary animal use before the study begins.

Worked example: How could refinement improve welfare in an animal-learning study? Refinement could involve using positive reinforcement instead of punishment, providing suitable housing and enrichment, and keeping procedures short enough to reduce stress. The researcher should also monitor animals for signs of distress and stop or adjust the procedure if welfare is affected. This keeps the research more humane while still allowing behaviour to be studied.

Evaluation and connections

Justify species and sample size for a worthwhile question. Too few animals can produce unusable evidence; unnecessary animals increase welfare cost. Existing husbandry remains relevant even when the study did not introduce it. Potential veterinary benefit is different from a measured welfare improvement.