

# **T Level Technical Qualification in Animal Care and Management**

## **Animal Management and Science Occupational Specialism**

**Research Project Guide Standard Exemplification Material  
Threshold Competence**

Version and date	Change detail	Section
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## Introduction

The sample evidence within this document refer to the Animal Management and Science Occupational Specialism research project. The aim of these materials is to provide centres with examples of knowledge, skills and understanding that attest to a threshold competence (pass) grade. The evidence presented here has been developed to reflect a threshold competence grade within each task but is not necessarily intended to reflect the work of a single candidate. It is important to note that in live assessments a candidate's performance is very likely to exhibit a spikey profile and the standard of performance will vary across tasks. The Guide Standard Exemplification Material (GSEM) illustrates linear performance across all pieces of evidence at the grade. A threshold competence grade will be based on a synoptic mark across all tasks.

The evidence in this GSEM is separated into the sections as described below. Evidence is presented against tasks from the research project. Assessors using the GSEM may find it helpful to review this document along with the sample assessment materials (SAMs).

### Task

This section details the evidence to be submitted for marking and any additional evidence required including any photo/video evidence. Also referenced in this section are the performance outcomes and the evidence will be marked against when completing the tasks within it. In addition, evidence that has been included or not been included in this GSEM has been identified within this section.

In this GSEM there is evidence from:

- Task 1
- Task 2
- Task 3

### Evidence

This section includes exemplars of evidence, photo/video recordings of the evidence in production (or completed). This will be exemplar evidence that was captured as part of the assessment and then externally marked by the assessor.

### Word counts

Typical word counts/page lengths, as indicated in the SAMs, are used as approximates for guidance to support the production of sufficient evidence. The marking will relate to the quality of the evidence produced and not whether the word count/page length has been met and candidates may be under or over the word count without affecting their grade.

## Commentary

This section includes detailed comments to demonstrate how the evidence attests to the standard of threshold competence.

It is important to note that the commentary section is not part of the evidence or assessment but are evaluative statements on how and why that piece of evidence meets a particular standard.

## Grade descriptors

**To achieve a pass (threshold competence), a candidate will typically be able to:**

Demonstrate an adequate level of performance that meets minimum industry requirements, to be able to enter the animal science industry to begin work in the occupational area.

Demonstrate an adequate understanding of husbandry plans and basic technical skills and techniques for carrying out routine health assessments associated with breeding and rearing animals.

Demonstrate a satisfactory understanding of human-animal interaction, applying safe and welfare orientated techniques when handling, restraining and moving animals, adapting them when necessary.

Interpret technical information to be able to plan and prepare equipment and work areas, assess risk and follow safe working methods appropriately when applying practical skills to a sufficient standard and within relevant legislation and regulations.

Produce basic population management plans for the care and monitoring of animals in accordance with relevant legislation, conservation and evolution.

Carry out adequate planning and research on reproductive technologies and gene manipulation including assessing the validity and reliability of sources.

Carry out basic analysis and evaluation of research to enable presentation of results to targeted audiences.

Demonstrate adequate knowledge and understanding of genetics and evolution of common wild and captive animals, health and nutrition for animals and the effects of disease on the animal with reference to veterinary practice and legislation.

Demonstrate adequate knowledge and understanding of fundamental scientific principles relevant to biology and chemistry for animal scientists.

Mostly use technical terminology accurately in plans, reports and documentation.

## Task 1 Planning and researching

Evidence contributes to the following:

Performance outcome(s)
PO1 Apply research methods to collect and analyse scientific information on reproductive technologies and gene manipulation.

Evidence	Candidate producing	Assessor producing	Included in this GSEM
Task 1a - Research proposal	√		√
Task 1b - Action plan	√		√

### Task 1a) Create a written research proposal for your research project

#### Candidate evidence – research proposal

##### Title

Research and compare the use of embryo transfer and genetic testing in dogs and cows.

##### Aim:

To discuss the ethics, uses and limitations of embryo transfer and genetic testing in cattle and dogs.

##### Objectives:

- examine the procedure of embryo transfer and genetic testing in cattle and dogs
- research how successful embryo transfer and genetic testing are in cattle and dogs
- research the ethics and limitations of embryo transfer and genetic testing in cattle and dogs.

##### Principles of the research design and methodology

The research method I will use for investigating the embryo transfer and genetic testing procedures in cattle and dogs will be from secondary sources. Secondary sources involve looking at information from internet sites, books, articles and journals and from this information I will write a literature review. Using more than one source would mean that the information is more accurate than if I just looked in one place.

## Sources of information

- Internet sites - veterinary sites may have more accurate information than individual breeding animal sites and contain more accurate details on embryo transfer and genetic testing. Kennel Club may have good detail on genetic testing in dogs.
- e-books - some books may not be available if not open access or the college library does not subscribe. Veterinary reproduction or cattle breeding/dog breeding and genetic e-books will contain some information needed for this research. I will need to look at the date when published to make sure it's not too old, as this may not have up to date details.
- Scientific journals - can access these on the internet/Google scholar - open access journals will be accessible. Need to make sure the journals are peer reviewed so that they have the correct facts.
- Newspaper/magazine articles - easily accessed on the internet. The view presented will be reflected by the article title and could be biased. These articles are written by journalists who do not have specific scientific qualifications and may not be accurate and could have facts that are one sided.

## Methodology

1. Examine the method of Embryo Transfer (ET) and genetic testing breeding cattle and dogs
  - Embryo transfer method
  - What genetic testing is done
2. How effective is embryo transfer and genetic testing are in cattle and dogs
  - Success of embryo transfer
  - Success of genetic testing
3. Ethics and limitations of embryo transfer and genetic testing in cattle and dogs
  - What ethics is linked to genetic testing and embryo transfer

## Techniques to analyse and interpret data

I will carry out a literature search looking for different sources of accurate facts on embryo transfer and genetic testing in cows and dogs. I will look at the uses, limitations and ethics of the procedures and with the information found will look at how each one affects animal health and welfare. I will use this to notify Guilds Genetics.

## Commentary

The candidate has submitted an adequate research proposal to investigate, analyse and compare the use and effects of embryo transfer and genetic testing in both cattle and dogs, using a range of sources to gather the information. For example, the methodology is adequate, giving the correct steps of the research in a logical order, but is missing the detail to show the smaller steps needed to carry out the research, such as breaking down each section into the questions they will need to answer in their report.

The candidate has made adequate consideration of the techniques needed to analyse the data they collect, such as literature searches, with assessment of validity and reliability of sources, but this is lacking depth. A literature review has been given as the method for analysing data to an adequate standard. For example, the sources of information have been considered for



validity and reliability, but is missing reasoning as to why the sources should or should not be used.

The candidate has shown adequate knowledge of planning and research by including basic knowledge on the principles of research design, but they could have expanded upon these further to support their set of objectives for the project. For example, they have stated that they will use secondary research, but not included their exact methods of this and so their objectives are not concise or broken down into easier to manage steps.

## Task 1b) Produce an action plan

### Candidate evidence – action plan

Topics to research	Resources needed and suitability	Search criteria	Timeline
Embryo transfer method - cow and dog	Internet site: genetic technology/e-book cattle/dog reproduction	How to embryo transfer Method of embryo transfer in dogs and cows	60 mins
Genetic testing in cattle and dogs	Internet sites - Kennel Club site Cattle breed sites Genus site- cattle breeding information	Genetic testing methods Genetic testing and hereditary disorders - cattle/dogs Genetic testing and parentage - cattle/dogs	60 mins
Success of embryo transfer and genetic testing	Success rates in dogs/cattle: internet sites (Kennel Club, veterinary sites, Genus site) Effect of genetic testing on numbers of hereditary disorders (published scientific journals) Do they help with animal breeding issues	UK Kennel Club- genetic testing use What genetic disorders can be tested for - in the dog/cow How successful is embryo transfer in cattle/dogs? Genus UK and advantages of embryo transfer in cattle Advantages of genetic testing in dogs and cattle	75 mins
Ethics and embryo transfer and genetic testing	What is ethics? (animal ethics internet site) How does ethics relate to embryo transfer and genetic testing? (journals - scientific) Animal welfare and genetic testing and embryo transfer (animal welfare internet sites)	Animal ethics –what is ethics Animal ethics and embryo transfer in cattle/dogs Animal ethics and genetic testing	75 mins

Limitations of embryo transfer and genetic testing	What can prevent embryo transfer and genetic testing being used in cattle and dogs?	Limitation of embryo transfer methods in cattle and dogs	45 mins
Laws/control of embryo transfer and genetic testing	Government website	Laws on reproductive technologies in UK	60 min
			360 mins = 6 hours

### Timeline and monitoring progress

I have six hours to complete my research into embryo transfer and genetic testing techniques used for cows and dogs. I have divided up the time between my tasks giving more time to some where I think will take me longer to find the information I need. I will need to keep an eye on the time as I complete the research to make sure I don't go over the time given to each section of research.

### Contingency plan

I need to think about what I would do if something unplanned takes place on the day's I need to do my research and what I may need to do instead.

- Not able to find the right information on the internet - think of another search criteria or key words to the one in my action plan.
- Feeling unwell on the assessment day - I will need to tell my tutor as soon as possible on that day. The tutor will rearrange for me to do the work needed on another day when I am well.
- Laptop not working - this could be because the laptop wasn't charged overnight or has been in use. I will need to ask my tutor for another laptop that is fully charged.

### Commentary

The candidate has produced an adequate action plan in line with the requirements of the research project brief but has not provided additional visual representation of the critical pathway analysis. A Gantt chart would have shown higher knowledge and skills for the planning of research.

The candidate has identified key criteria to research to follow their identified objectives, achieve the aim of the assessment and carry out research within the documented time frames, however the candidate has planned for more time than they have available. For example, they have explained that they will monitor the timeframes whilst completing the research and not go over, but the times add up to over six hours which demonstrates a lack of attention to detail.

The candidate has used an adequate structure of the action plan to align with their methodology but has missed some opportunities to be more specific, such as the questions that they will need to answer in their research report. The table allows for each stage of the

research to be considered individually with an adequate time limit, although these do not add up correctly. For example, the sources and their suitability has been considered in the same column of the table, showing understanding that they need to be relevant to the research. However, a lack of specificity in naming sources and giving more detailed search criteria may impact the quality of the research.

## Task 1c) Carry out your research

The research notes provided are one side of A4 exemplar notes of the expected standard to be produced by the candidate but are not marked so no commentary has been provided.

### Candidate evidence – research notes

**Embryo Transfer**- more common in cattle than in dogs. Need qualified vets to do the embryo transfer - Veterinary surgeons act 1966. Legal. Females used in embryo transfer need to be healthy and young. Vet and owner / farmer have control and decide when to do the embryo transfer and get the females ready. Need to artificially inseminate females to make sure the donor gets pregnant and has embryos before removing  
Success depends on how good person is, have females been prepared properly and the age of females. Cattle 50% success - mainly pedigree cows Absolute genetics

<https://absolutegenetics.co.za/bovine-embryo-transfer/#:~:text=Fresh%20embryos%20have%20a%20conception,embryos%20on%2040%25%20conception%20rate.>

30% success in Dogs Wag site. Does not take place in puppy farms as too expensive - cost £25,00 not make a profit <https://wagwalking.com/treatment/in-vitro-fertilization#:~:text=Developed%20IVF%20procedures%20in%20Dogs,by%20IVF%20in%20the%20future.>

Donor produces embryo (egg and sperm fused to produce embryo. Sperm from male placed onto donor by artificial insemination); embryo collected (called harvesting) from donor; recipient one the embryo is inserted. Donor and recipient at the same stage of the cycles (given hormone injections over a number of weeks - follicle stimulating hormone, luteinizing hormone, oestrogen, progesterone).

Superovulation - lots of eggs produced from donor's ovary

Embryo collected






- In dogs Surgery - general anaesthetic, laparoscopic surgery into womb - collect embryos. Embryo collected from donor- then placed into recipient womb same way
- In cattle - non-surgical - local anaesthetic. Collect embryos -enter the womb through the cervix. Embryo is put into the recipient the same way.

Recipient - embryos grow here until they give birth. After giving birth, the recipient will look after the newborn/young calf or puppy.

**Genetic testing:** Kennel Club register dogs; Sperm testing male/female cattle (Quelas)- 75-90% accurate on sex. More common in dogs - expensive in cattle  
blood sample (only vet can do this veterinary surgeons act 1966), swab or sample from cheek cells (owner can do this). Sample goes to the laboratory -analysis - results say if the animal has a genetic disorder or is carrying a genetic disorder. Carrier doesn't show they have the disorder.

Genetic disorder in dogs- glaucoma, von Willebrand disease- EthosVet

<https://www.ethosvet.com/blog-post/5-things-a-Dog-dna-test-can-tell-you-about-your-Dog/#:~:text=%232%3A%20Health%20%26%20Genetic%20Risks&text=These%20health%20kits%20can%20screen,Dystrophy%20found%20in%20Golden%20Retrievers.>

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♀		100%	50% 50%	100%
		50% 50%	25% 50% 25%	50% 50%
		100%	50% 50%	100%

<https://www.lierchonpoo.com/cavaliercavachoncavapoooblog/whats-so-important-about-Dog-dna>

## Task 2 Research report

Evidence contributes to the following:

Performance outcome(s)
PO1 Apply research methods to collect and analyse scientific information on reproductive technologies and gene manipulation.

Evidence	Candidate producing	Assessor producing	Included in this GSEM
Research report	√		√

### Task 2) Produce a written research report

#### Candidate evidence – research report

##### Title

Research and compare the use of embryo transfer and genetic testing in dogs and cows.

##### Aim:

To discuss the ethics, uses and limitations of embryo transfer and genetic testing in cattle and dogs.

##### Objectives:

- examine the method of embryo transfer and genetic testing in cattle and dogs
- research how successful embryo transfer and genetic testing procedures are in cattle and dogs
- research the ethics and limitations of embryo transfer and genetic testing procedures are cattle and dogs

##### Introduction

Embryo transfer and genetic testing are examples of breeding techniques that are used in mammals all over the world to try and increase the number of offspring and improve the quality of the offspring. Other techniques that are used include artificial insemination, natural insemination and cloning. Embryo transfer allows a large number of offspring to be produced from one female and prevent species extinction. Embryo transfer can be very expensive and result in lots of problems with the pregnancy. Genetic testing is used to decide who the parents are which can be really useful in dogs because lots of breeders like to know the parentage of their dogs. Genetic testing is also important to identify genetic disorders and prevent their spread to the next generation.

## **Embryo transfer**

Embryos produced in a female animal, called the donor, are collected when the female is asleep. These are checked in a test tube to make sure they are healthy and then the healthy ones are put into another female, who is called the recipient. The donor female is given a lot of hormone injections by the vet who is the only person allowed to do this because they are qualified. These injections are given over a long period of time to make her ovaries active and release a large number of eggs. This is called superovulation. The more eggs that are released; the more embryos are produced as one egg meeting one sperm will produce one embryo. The embryos need to be taken out of the female and this is done by a method called harvesting. Harvesting can be done either non-surgically without surgery or surgically where the vet will need to use instruments. Non-surgical harvesting means the donor is given local anaesthetic which numbs a part of her anatomy so she doesn't feel them taking the embryos out. The embryos come out through the cervix which is the exit of the womb. This is the method commonly used in cows but other methods can be used in cows as well. The surgical method means the donor has to have a general anaesthetic and a keyhole surgery which means that a small hole is put in the abdomen with a camera to see what they are doing. This is the way they collect the embryos from the womb. This is the method used in dogs and sometimes in cattle but it can be very expensive in cattle as the anaesthetic will cost a lot. The recipient animal is prepared and will only have one of the embryos from the donor placed inside her womb. The embryo is placed either surgically (in dogs) or non-surgically (in cows) depending on the species. The embryo will grow and develop inside the recipient's womb as it is the natural place for it to grow and develop. The recipient will give birth to and look after the young until they are weaned.

Embryo transfer is used more commonly in cattle than in dogs. Embryo transfer has been practiced more and been taking place longer in cattle than in dogs so they are better at doing the technique in cattle than in dogs. The success of embryo transfer in cattle is about 50% (Absolute genetics) and in dogs is 30% (Wag website). Success is where the recipient gives birth to the young and looks after it successfully. The success of the embryo transfer depends on the species (dog or cow), breed (large breed dog, small breed dog, quiet cows), person doing the procedure (how good they are, their experience) and if the recipient and donor are at the exact same point of the breeding cycle for the embryos to move from one animal to the other. Success is better in the cow as embryo transfer takes place routinely in many pedigree cow herds in the UK which costs a lot of money, and the owners are more willing to spend money on them. In dogs, embryo transfer does not take place in dog breeding farms or puppy farms as it is too expensive and puppy farm breeders are more interested in making money than in spending it.

## **Genetic testing**

Genetic testing involves taking a blood sample (can only be done by a veterinary surgeon as a needle needs to be put into the animal which owners cannot do as it is illegal) or a cheek sample (can be done by owner as all they need to do is put a swab into the mouth) and sending this sample to a laboratory for analysis. Genetic testing is used in both cattle and dog breeding to give the owner information of the animal's parentage and to make sure the animals are not related. It also checks if the animal is carrying any genetic disorders that can be passed onto their offspring. This information helps owners to decide whether the dog or cow should be used for breeding. Dogs and cows that are carriers of a genetic disorder should not be used for breeding as they will pass their genetics onto the young and the young may have the genetic disorder which could make them sick. This can be seen from the figure below where animals are mated together. Some are normal, some are carriers, and some are diseased and



it shows how many of the pups would have the problem if they were mated together. If a normal mum and dad were mated they would produce only normal puppies. If a carrier dog and a carrier dog were mated, they would produce a lot of affected puppies.

**Genetic testing Figure**



Dogs can be tested for many genetic disorders such as Glaucoma which is an eye problem and Von Willebrand Disease which is a blood problem (Ethosvet). Genetic testing can also be used to identify the dog or cows' parents, and this is used to decide what or who to breed with (Ethosvets) to avoid in-breeding. Inbreeding is where closely related parents are mated together and produce offspring that may have a large number of problems. Inbreeding needs to be avoided so this is where genetic testing comes in as not all breeders know the background to their animals. There are lots of laboratories in the UK that offer genetic testing in addition to the Kennel Club for dogs. The laboratories all charge differently so it could cost a lot or less dependent on which one you send it to. They will also take different amounts of time to send the results back. The biggest problem with genetic testing is that the test is very specific to specific breeds, for example eye problems like glaucoma can be seen in lots of dog breeds and each dog breed has to have its own special genetic test to identify the genes causing the disorder as it may be a different gene causing the same disorder in different dog breeds.

The Kennel Club hold a register to identify breeding dogs that have tested negative for genetic disorders, if these dogs are used for breeding and genetic testing will be really successful in stopping the puppies having the genetic disorders (University of Cambridge). This register could be used by breeders to help them decide which dog to mate with their bitch to produce puppies. Genetic testing to identify carrier cows (which are cows that look normal but may be carrying genes that are faulty), is used in the UK but is really expensive so only valuable pedigree animals are tested, normal herds are not. Genetic testing in cows is used more to check if a sperm or embryo is male or female (Absolute genetics). This is important if the farmer wants to have female calves as they are worth more money and can go onto breed more calves. This is also important if they want to make sure that the farm is making money and successful as a bull calf is worth less money. Sex testing the sperm is 75 -90% accurate (Quelas 2023).

## **Ethics and welfare**

Ethics is knowing what is the right and what is the wrong way to treat animals and what we can and what we shouldn't do. Embryo transfer and genetic testing are techniques that are performed in cattle and dogs but is it right? Should we be doing it? How far should we go? We do not ask the animal their permission to do the procedures! The donor and recipient dogs need to have a lot of hormone injections, handling, restraint and a general anaesthetic to allow the vet to carry out the embryo transfer surgery. This is really invasive and has a big effect on the animal's welfare and we should be thinking about this before we do it. This is a lot for the dogs to go through, especially if only 30% recipients become pregnant and have a litter of puppies so not many of them are successful.

Should cattle sperm and embryos be identified as male and females? There is a 50:50 chance naturally, are we not being over controlling and deciding the cows have to have only female calves? Is this playing God, and should it be allowed? It makes sense for the farmer as they get more money for females as females can have calves and produce milk but is it right? This may mean we don't have any males to produce the sperm in the future!

## **Evaluation of the project and action plan**

The report was interesting but there was lots of information on the internet, and it was difficult to find some of the information I needed for my report. I followed my action plan which I think was well set out and easy to follow. When I put my search words into the internet, it didn't always give me the answers I wanted, there were a lot of scientific journals which were hard to read and understand. I managed to get the information I needed to complete the research and used websites that were I think credible as they were from veterinary practices or genetic research laboratories.

I made sure I kept to the times I had given for each part of my research even if it meant that I didn't get all the answers and details I needed.

Overall, I feel my proposal and action plan worked well and I managed to finish my report where I discussed the ethics, uses and limitations of embryo transfer and genetic testing in cows and dogs.

## **Conclusion**

Both embryo transfer and genetic testing techniques are used in cattle and dogs and this report shows how each procedure is carried out, success rates, limitations and ethical concerns. This report will help Guilds Genetics to understand the process of embryo transfer and genetic testing in dogs and cattle.

## **References**

Absolute genetics <https://absolutegenetics.co.za/bovine-embryo-transfer/#:~:text=Fresh%20embryos%20have%20a%20conception,embryos%20on%2040%25%20conception%20rate>. Accessed 2nd April 2024

EthosVet <https://www.ethosvet.com/blog-post/5-things-a-Dog-dna-test-can-tell-you-about-your-Dog/#:~:text=%232%3A%20Health%20%26%20Genetic%20Risks&text=These%20health%20risks>

20kits%20can%20screen,Dystrophy%20found%20in%20Golden%20Retrievers. Accessed 2nd April 2024

Genetic testing figure <https://www.lierchonpoo.com/cavaliercavachoncavapoooblog/whats-so-important-about-Dog-dna> Accessed 2nd April 2024

Quelas (2023)

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10704908/#:~:text=According%20to%20EMLAB's%20data%2C%20sperm,fresh%20semen%20and%2080%E2%80%9385%25>

Accessed April 2nd 2024

University of Cambridge <https://www.cam.ac.uk/stories/preventing-genetic-diseases-in-Dogs> Accessed 2nd April 2024

Wag Website <https://wagwalking.com/treatment/in-vitro-fertilization#:~:text=Developed%20IVF%20procedures%20in%20Dogs,by%20IVF%20in%20the%20future>. Accessed 2nd April 2024

## Commentary

The candidate showed adequate knowledge and understanding of the reproductive technologies and gene manipulation, with the report examining the use, limitations and advantages of embryo transfer and genetic testing in the cow and the dog. Their discussions on the ethical and welfare concerns of the techniques demonstrate an adequate knowledge of how the techniques can affect the animals' welfare but is lacking detail in some areas. For example, the amount of hormones and handling needed for the genetic techniques has been discussed as a welfare concern but the candidate has missed opportunities to discuss this in terms of impact to the breeding of the animals and the company as a whole.

The candidate has produced a basic report, with adequate headings but these could be more descriptive to allow for better navigation within the report. The literature review makes some comparisons between the species for the use of each technology but has missed opportunity to discuss the success of these in some cases. For example, identifying that genetic testing is done more in pedigree dogs for hereditary diseases and in cattle for sexed semen, shows understanding of the uses of the technologies. However, the candidate could have given more information around the efficacy of the technique for both species where currently only sexed semen results are discussed.

The candidate has given a basic analysis and evaluation of the research process, discussing their time management and action plan. The candidate was able to identify where research was difficult to find but did not always recognise their own errors during the research process such as use of potentially biased sources. For example, they identified that they kept to time and got an adequate amount of research in order to write the report but they missed the opportunity to discuss that information gathered from research laboratories may be biased due to the potential funding considerations behind them, therefore impacting the validity of their research.

## Task 3 Presentation

Evidence contributes to the following:

Performance outcome(s)
PO1 Apply research methods to collect and analyse scientific information on reproductive technologies and gene manipulation.

Evidence	Candidate producing	Assessor producing	Included in this GSEM
Task 3a - Scientific poster	√		√
Task 3b - Presentation	√		√
Task 3b - Video(s)		√	√

### Task 3a) Create a digital, scientific poster

#### Candidate evidence – scientific poster

# Research and compare the use of embryo transfer and genetic testing in dogs and cows

Candidate Number CSG1234

## Aim & Objectives

### Aim:

•To discuss the ethics, uses and limitations of embryo transfer and genetic testing in cattle and dogs

### Objectives:

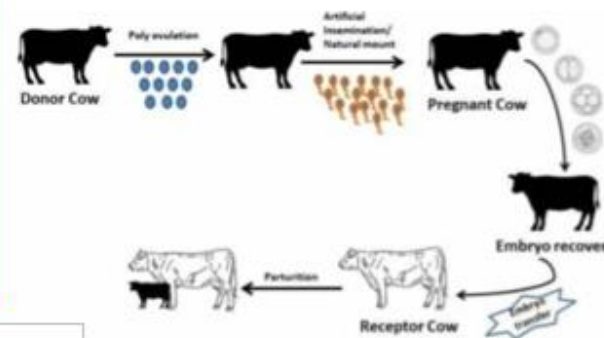
- To examine the methods of embryo transfer and genetic testing in cattle and dogs
- To research how successful embryo transfer and genetic testing methods are in cattle and dogs
- To research the ethics and limitations of embryo transfer and genetic testing methods are cattle and dogs

Embryo transfer and genetic testing are examples of breeding techniques. Embryo transfer is making embryos in a donor animal, removing them from her and transferring them into another recipient animal. Genetic testing identifies animals that may have a genetic disorder or may carry a genetic disorder.



## Embryo Transfer

Embryo transfer is performed in both cattle and dogs. Cattle that are chosen for embryo transfer have superior traits and are pedigree animals. Embryo transfer in dogs only takes place in research and so is not a procedure that ordinary breeders would be able to use. The government makes sure companies like Genus breeders are registered to be able to offer this technology to farmers. Embryo transfer is successful in about 65% of cases in cattle and 30% cases in dogs. It helps female cows to have calves even if they are infertile. It reduces the number of animals travelling to different countries as the embryos can be sent. Embryo transfer is expensive and the donor and recipient animal go through a lot of tests and injections to make sure they can produce the embryos and carry the embryo until birth.



## Genetic testing



Genetic testing is important to use in cows and dogs to help pick out those animals that may have a genetic disorder or may be carrying a genetic disorder. A carrier animal can pass the problem onto its offspring giving them the genetic disorder. Dogs are regularly tested for genetic disorders such as hip dysplasia and collie eye anomaly. Only pedigree expensive cattle would be tested for genetic diseases. Dogs and cattle can have genetic testing to see their parentage. Cattle sperm and embryos are usually tested to see their sex as dairy farmers don't want male calves. Genetic testing will improve the welfare as it will stop the puppies and calves from getting genetic disorders which can be painful in some.

## Conclusions

Both genetic testing and embryo transfer are expensive and, in most cases, only done on pedigree animals. Embryo transfer can help with stopping the transport of live animals, which is a welfare problem. Genetic testing can help with stopping the spread of genetic disorders and therefore produce healthier young.

Embryo testing is not done routinely in dogs due to the high cost and poor success of getting the donor and recipient at the same stage of the reproductive cycle. It is not regulated, so would be a worry as not controlled as to who will do the technique. Only vets are legally allowed to do surgery on animals and this technique would need vets, but ethically would they be happy to allow dogs that can't breed naturally to produce puppies.

Genetic testing is not able to pick out every animal with a genetic disorder as there are so many different genes and breeds of dogs and cattle, but it does help. Genetic testing has reduced the number of genetic disorders in dogs.

## References

### Genetic testing Figure

<https://www.lanorchonpo.com/cavaliercavachoncavapooiblog/whats-so-important-about-dog-dna>

### Embryo Transfer Figure

<https://www.researchgate.net/figure/Multiple-ovulation-embryo-transfer-technology>



## Commentary

The candidate has produced an adequate poster explaining the process, limitations, success and ethical considerations of embryo transfer and genetic testing in both cattle and dogs. Information they have included is relevant but basic and they have missed the opportunity to consider the targeted audience in all sections of the poster. For example, the candidate has mentioned the main points of their research and the sections on the technologies are suitable for the Team Leader with adequate technical terminology. However, sections surrounding the main research are simplistic and better suited to an audience without as much technical knowledge using more simple technical terminology and less detail.

The poster includes each relevant section to meet the requirements of the task in an adequate format. The sections align with those of their research report but they have missed the opportunity to use separate sections for each reproductive technology. For example, the candidate has placed information in demarcated areas within the poster in line with their report demonstrating the need for a good layout. However, they have not separated information between the two different technologies, which impacts the readability and clarity of this section.

## **Task 3b) Present the scientific poster**

### **Candidate evidence – video(s)**

AMS GSEM Research Project Task 3 Presentation TC.

### **Commentary**

The candidate demonstrated basic presentation skills to targeted audiences, introducing the poster in line with the brief, but they missed the opportunity to show better presentation skills by reading from the poster instead of talking around it.

The candidate was mostly clear throughout, but there was some hesitation in places limiting the flow of the presentation. The candidate mostly used technical terminology accurately and appropriate to the target audience but there was reliance on the poster to remember these terms. For example, terminology such as 'recipient' was remembered by checking the poster and used correctly, but some words were stumbled over, limiting the effectiveness of the presentation.

The candidate discussed each element of the poster in some detail but reading from the poster limited the amount of detail that could be given. The presentation was of the correct length but some of this was unnecessary or out of context or sequence. For example, the candidate explained each section in a suitable order showing some planning of what they were going to say. However, at some points the candidate doubled back to information that had already been discussed and then stopped abruptly, showing a lack of clear time keeping and planning throughout.

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