

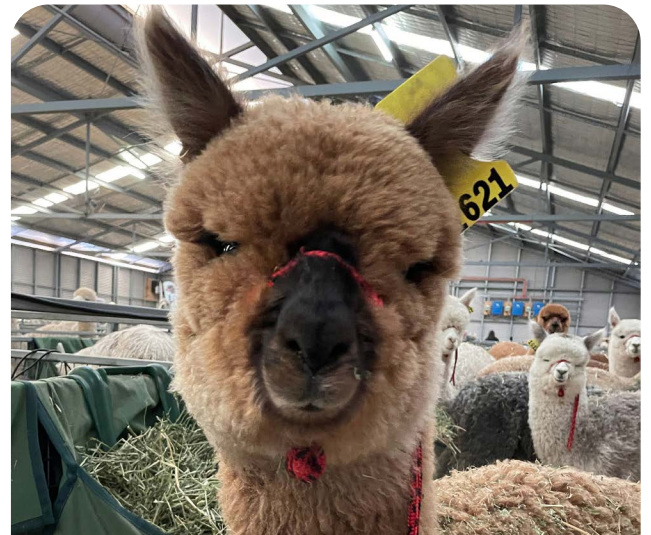
LITERACY ACTIVITY

NLIS, Traceability Technology

The National Livestock Identification System (NLIS) provides permanent identification and lifetime traceability for all of Australia's cattle, sheep and goats. All animals are identified with an accredited NLIS tag or device from their property (PIC) of birth. As animals are bought, sold and moved along the supply chain, each movement is recorded centrally on the NLIS database to provide a life history of an animal's movements. The implementation of NLIS technology shows Australia's commitment to biosecurity and food safety and provides a competitive advantage in a global market (Integrity Systems, n.d.).

The Australian alpaca and llama industries are currently transitioning to the NLIS database requirements for biosecurity purposes with the integrity systems company. NLIS eartags for alpacas are currently being used, whilst the brass international alpaca registry (IAR) tags are phased out. At present, either of the tags can be used, with the alpaca industry moving towards completely utilising the NLIS in the near future.

Ear tags are currently used to identify alpacas. All Australian Alpaca Association registered alpacas must have brass IAR tags or plastic NLIS tags. These display the animal's unique number and are used for traceability in all aspects.



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LITERACY ACTIVITY

NLIS, Traceability Technology (cont.)



Scan the QR code or click on the [link](#) to view the source material.

▶ How the National Livestock Identification System (NLIS) works (2:53)
<https://www.youtube.com/watch?v=pITHOXixPCI>

Answer the questions below.

1. Is the NLIS considered a technology? Explain your answer.

2. Outline the three elements or technologies that the NLIS combines.

3. Why is the technology valuable to the livestock industry?

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VIDEO ACTIVITY

Introduction to Genetics

Genetics is the study of genes and how they are inherited. Understanding genes is essential to producers and impacts how they manage their plants and animals. Genes control the characteristics and traits of organisms and therefore are linked to the quality of agricultural products. Sometimes a single gene (and its copy) work to control a character in an organism, other times, it is the work of a combination of genes causing a particular trait.



Watch the video and record at least one point under each subheading focused on genetics.

▶ **What makes Australia a great home for the Alpaca** (1:17)

https://www.youtube.com/watch?v=7Xn0fIPE_jk

Selective breeding:

Reputation for:

Suited to the environment:

Types of testing available:

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Focus on Genetics

In the past, producers would select animals to breed based on their phenotype (appearance) and then wait to observe if the desired traits were passed from the parents to the offspring. Genetic analysis of animals has significantly improved this process, and now animals are often selected based on quantifiable data – their genotype for particular traits.

Alpaca producers are interested in genes that control the traits of fleece micron, reproductive success, conformation, fleece density and weight, and uniformity of fleece characteristics. Superior animals with these traits are selected and used in breeding programs to increase the probability of their offspring also having these traits. Animals that perform poorly are culled from a herd.



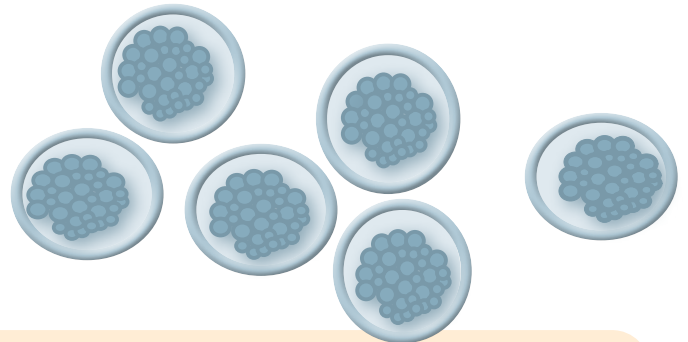
Examples of colour variation in alpaca fleece:



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Focus on Genetics (cont.)



Embryo Transfer

What is it?

Embryos from a superior female are flushed (taken out) and inserted into a donor mother that will give birth to the offspring after the gestation period.

Use in the alpaca industry:

This is a successful innovation being used in the alpaca industry. This method increases the number of quality offspring to which a superior female can pass genetics over her lifespan (not just a single offspring per year).

Click on the [link](#) to watch how embryo transfer is performed in cattle. This is a similar process to how embryo transfer is achieved in alpacas.

▶ Improving bovine herd genetics with cutting edge embryo transfer (6:52)
<https://www.youtube.com/watch?v=YFMLxy4kjSQ&t=143s>

Across-herd Genetic Evaluation (Age) Program

What is it?

A genetic analysis uses objective measurements to create Breeding Values (BV) for particular traits.

Use in the alpaca industry:

This information provides the animal's ability to pass a particular trait on to offspring and compares animals to each other.

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CASE STUDY ACTIVITY

Gene Technology and Innovation



Colour Genetic Testing Desirable Colours and Genetic Defects

Scan the QR code or click on the [link](#) to view the source material. Read the text and listen to the recording focused on colour genetic testing.

▶ Alpaca breeders learn colour genetics to achieve better breeding outcomes
<https://www.abc.net.au/news/rural/2014-11-12/determining-colour-in-alpacas/5882552>

DNA tests are available for coat colour testing through the Australian Alpaca Association (current cost \$38.50).



The DNA test for identifying colour in alpacas helps breeders better predict breeding outcomes. This interests alpaca breeders as an alpaca may look like one colour, but it might be something else! Coat colour in alpacas is a complex trait involving two central genes responsible for base coat colour. Alpaca fleece has 22 natural shades that range from black to white, grey, and dark to light fawn. Breeding for a specific coat colour can be a complex process.

The 'classic grey' phenotype can be problematic in breeding due to its association with the blue-eye white phenotype and associated possible health defects. Classic grey can be hidden or cryptic on white or light backgrounds.

With the release of the Alpaca Coat test, breeders can test their white or light fawn animals, those with uncertain patterns or mutations, or animals they wish to determine the base coat colour, to deduce common progeny colours. (Australian Alpaca Association, nd).

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CASE STUDY ACTIVITY

Gene Technology and Innovation (cont.)



Answer the questions below.

1. Identify the number of colours recognised in alpacas.

2. What pigments are mixed to produce genetic brown fibre?

3. Describe an advantage to breeders in accessing a DNA test.

4. Describe the effect of inheriting two copies of the 'grey' genome.

5. What does the genetic disorder blue-eye white lead to?

6. Identify the obstacles in developing a DNA test.

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