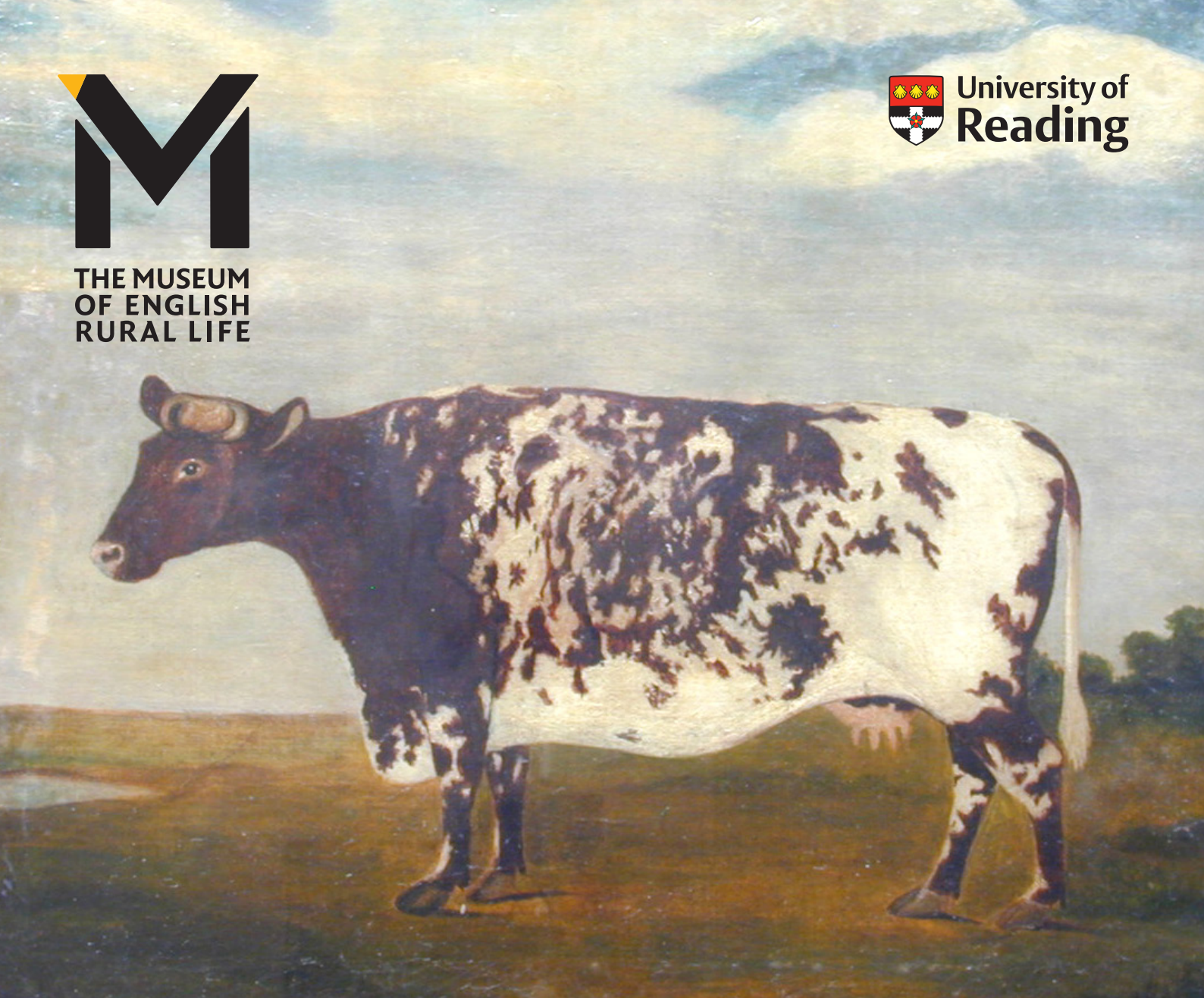




THE MUSEUM  
OF ENGLISH  
RURAL LIFE



University of  
Reading



# What is selective breeding and why is it still relevant today?

Is it always ethical to make changes to animals through breeding?

Your pupils will know why people have used selective breeding in the past and why it is still relevant today. The activities focus on cows with pupils discussing ethical questions using artefacts and archives together with their own research. They will look at 'elite' or 'giant' cow paintings and the changes in cattle breeding since artificial insemination. Pupils may also consider what food choices they make themselves.

# Learning outcomes

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By the end of the activities students will:

- Have a greater knowledge of sexual reproduction and selective breeding in animals, particularly cows.
- Know how farmers and scientists have worked for two centuries to breed animals selectively and purposefully, building on millennia of selective breeding through traditional and regional farming practice.
- Have used The MERL collections to increase their knowledge of selective breeding.
- Collect and use information from their visit to inform ethical questions and debates, and to, know how to make personal food choices.

## Before your visit

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### Introduce selective breeding

Do any of your pupils have a pedigree pet? Why do we pay more for a pedigree dog or cat? How is the pedigree line kept? Discuss the difference between pets and livestock.

Now let us think about cattle (cows). Explain that farmers have cattle to create milk or as livestock to be killed for beef for us to eat. We want to eat and drink good quality food products from animals: milk, cheese, and beef. From the eighteenth-century people have chosen traits in animals that they have liked and encouraged them to breed together. Choosing what happens between animals in this way is a process of selectivity. What might a farmer look for in an animal? Start a pre-visit discussion about foods we eat, and which parts of an animal are valuable.

People have used selective breeding in the past and continue to do so. But is selective breeding still relevant today? To what extent does it matter what cattle experience?

Watch the animated film '[Land of the Giants](#)'.

### Robert Bakewell: the 'father' of artificial selection

You may wish to explore the historical context of Bakewell's work to give a sense of period. Pupils can think about differences between lifestyle and thinking in the 1800s and today. You could include the agricultural revolution, the

#### THEMES AND TOPICS

- Healthy and ethical eating
- Sustainability and the environment
- Economic activity
- Evolution, inheritance and variation
- Challenges for Britain, Europe and the wider world, 1901 to present day
- Population and urbanisation
- Use of natural resources

#### LINKS WITH OTHER ACTIVITIES

These activities could be used in conjunction with the:

- 'What is the future of our countryside?'
- 'What was farming like before modern technology?'
- 'The impact of technological change on food production'
- 'Diet Detective'

resources found on our [webpage](#).

For an introduction to the first 12,000 years of farming, you can visit this online exhibition of objects created by [The Museum of English Rural Life and Pitt Rivers Museum](#).



This resource works alongside our short [Land of the Giants animated film](#).



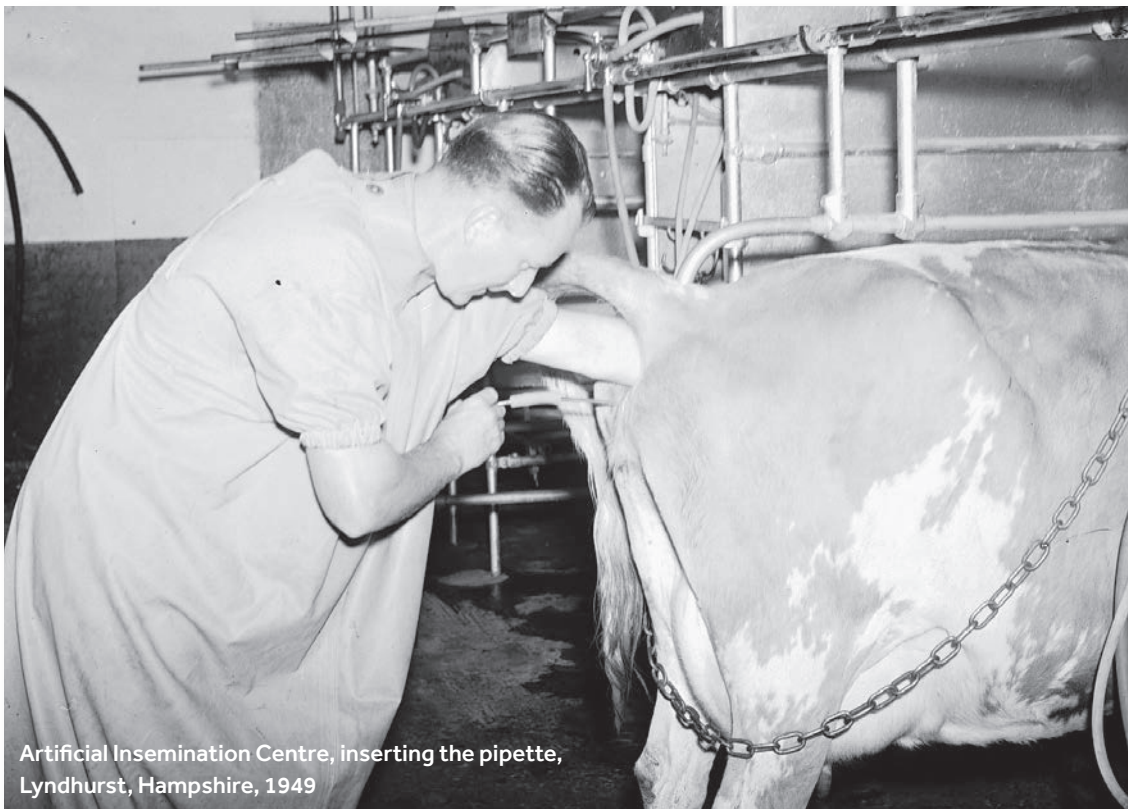
population boom, and the growth of towns. Explore the work of others in changing agriculture e.g. Jethro Tull, Charles Townshend and his crop rotation and crop for livestock. Think about the other unnamed men and women, from farmers to farm workers, whose work underpinned these developments.

As you see from the animated film, Robert Bakewell chose which animals to put together for mating. The main goal of any animal species is to reproduce and mating normally happens naturally between a male and female animal, without assistance from people. The baby animal grows in their mother's womb until it is born. Calves are the offspring of a female cattle (a cow), and the male (a bull).

## Artificial insemination (AI)

Internal fertilisation is what happens inside a cow, the union of the male and female sex cells, the sperm and the egg, to make an embryo. This can be done naturally or in the case of Artificial Insemination it is done without the male being present but with his sex cells or semen inserted into the female using scientific instruments.

Explain that the process of AI by using photograph below. The image shows the back of a female cow and the farmer is reaching inside her, towards her cervix, with semen. What scientific instrument did you see being used in the animated film?



Artificial Insemination Centre, inserting the pipette, Lyndhurst, Hampshire, 1949

## Why use Artificial Insemination (AI)?

Apart from choosing the genes of your animals AI can also ensure:

- More pregnancies i.e. more calves.
- Farmers can plan when calves will be born around the same time rather than all year round, saving labour costs.
- Animal breeders can select desired genetic characteristics rather than relying on local animals.
- AI is also useful for endangered species where males are difficult to transport.



## Sire

Sires are male parents, often bulls, kept for breeding. Artist Maria McKinney created the artworks worn by the bull. Genetics can be complicated, both scientifically and ethically, and the artist explores this in her art. A description of the artwork can be found on the online exhibition called Sire [here](#).

### Mr Universe

Environmental Footprint/Cornucopia,  
Bivouac (CH2218)

Archival pigment print, 125 x 225 cm, 2016  
© Maria McKinney

## What is the difference between Genetic Modification and selective breeding?

Selective breeding is a *form* of genetic modification which doesn't involve the addition of any foreign genetic material (DNA) into the organism. Instead, selective breeding is the conscious selection for desirable traits.

Pro-GM campaigners argue that people, not just farmers like Bakewell, have been 'genetically modifying' organisms for thousands of years. Even though those people wouldn't have known that the traits they sought were determined by genes. For example, people have always selected cows with the highest milk yield and bred from these to produce herds with good milk production.\*

You could also try 'Hungry City' game on the [Crunch website](#). For 16–19 year olds '[Feeding a growing world](#)'.

\*This text is adapted from [science media centre, New Zealand](#)

# Visiting The Museum of English Rural Life

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Divide the class into four groups. Set them a mission to gather resources for a debate.

You could even provide them with named labels to remind them of who they represent!

Or, provide personalised postcards e.g. an image of a farmer, including name, age, years as a farmer and a brief outline of their opinions.

Can you find examples of selectively bred animals, such as cows, pigs and sheep?

Research the perspective of their character on the topic of selective breeding in the past and present:

- a farmer
- a banker
- a cow
- a consumer i.e. a person who buys and eats the beef.

A tip for the consumer role: you may want to ask pupils to bear in mind cultural and dietary sensitivities around eating beef.

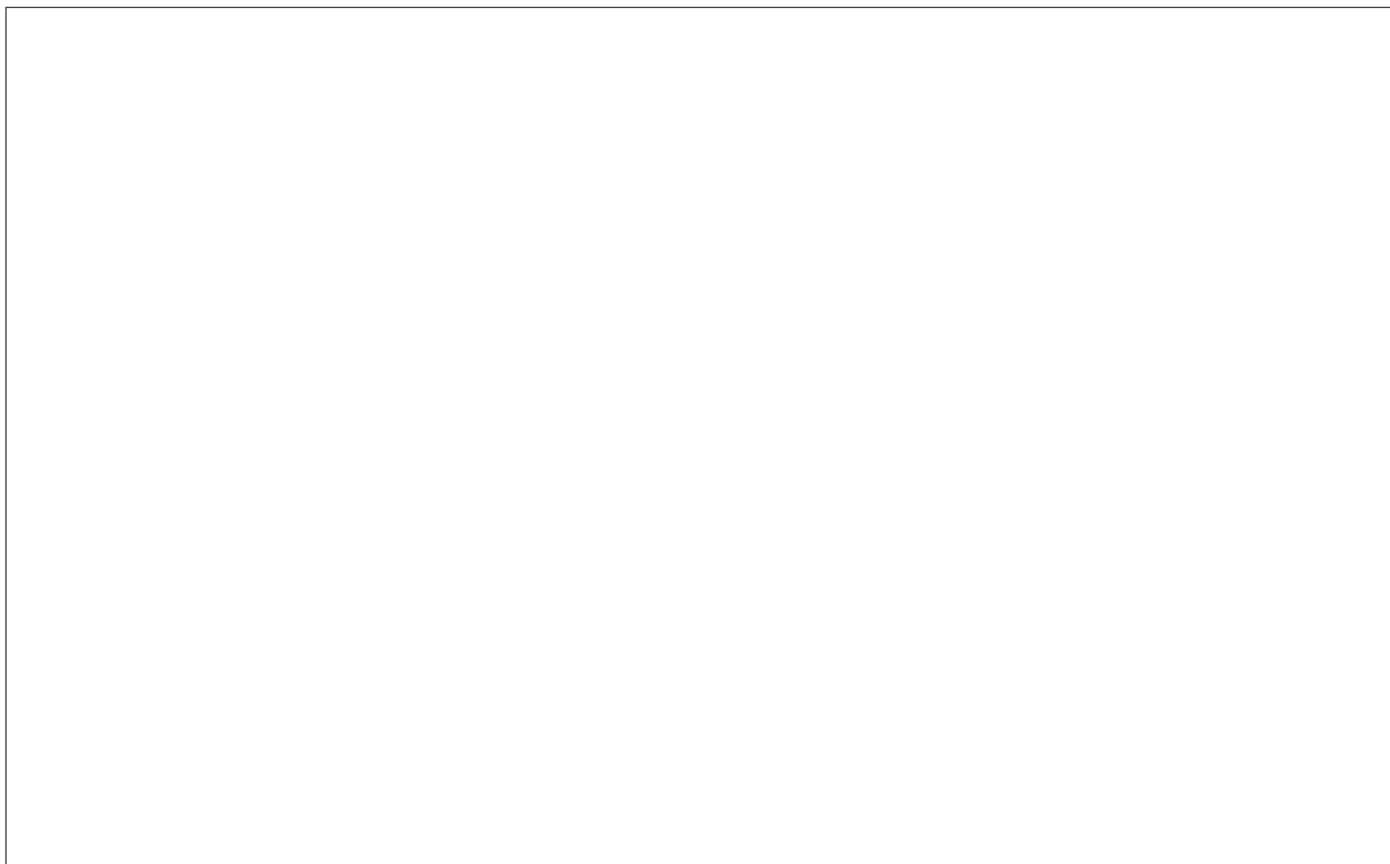
There are some role profiles available in 'What is the future of our countryside?' (see pages 6–11).



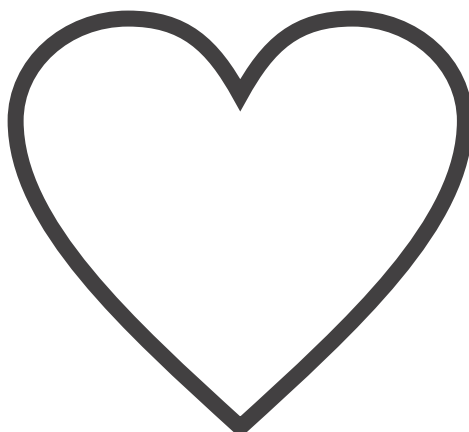


# Selective Breeding Game Player

Sketch your farm character here



Put some words into these bubbles for your character's thoughts, feelings and speech, make a note of where you found this evidence/inspiration:



# Our Country Lives Gallery

Look at the game 'Grade Up to Elite Cow'.

## Questions to ask students

- What is the aim of the game?
- Why were they made?
- Who sold these?
- Why are there advertisements around the outside edge of the game?
- What did the game aim to encourage farmers to do?



Grade up to elite cow game, 1986

# What next?

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Breeding an 'elite' cow was portrayed as a game – but it was, and still is, a serious business.

What does the next generation need to consider for the future?



Remind students that they saw famous 'poster' cows that were toured, and merchandise sold such as prints.

The Curator at The Museum of English Rural Life believes that there was just a small amount of artistic licence in the late-eighteenth and early-nineteenth century paintings; they were 'not extreme' representations. Why were paintings produced? Ask students to consider media and methods of sharing information during the 1800s.

Move forward in time – how would a farmer in the present day promote their bull? Today you would use social media to promote your bull. You would want your bull to go 'viral'. Explore the pros and cons of this method.

'Champion Shorthorn', an oil painting by William Smith, dated 1856. The proud owner and farmer has been included in the picture also. An inscription on the back of the painting states that this animal won the First Prize at Chichester Cattle Show in 1856.



# Debating your future!

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First, you can get tips for a great debate in 'holding the debate' on page 5 of another Museum teacher resource, 'What is the future of our countryside?' and pages 6–11 gives other roles.

The film asks, is it always ethical to make changes to animals through breeding? It can lead to health problems and suffering for the animals.

## Debate statements

Humans know best and should keep doing selective breeding.

Making profit is important to sustain farming in England so we should continue.

The process of selective breeding practices can be uncomfortable for cows and the results such as heavy bodies can be painful so it should stop.

People should get the best quality beef, no matter what happens to animals.

# What will an 'elite cow' of the future look like?

In groups of four, design a 'perfect cow' from a farming meat providing perspective, this could be the next famous poster.

Choose parts of collection images to collage together to start you off.



Annotate your design with your thinking using notes and diagrams.

You can choose from these cards of desirable attributes or traits which can be found on the next page.

Top left: The Durham White Ox (a mezzotint print by George Garrard), thought to date from the last quarter of the 18th century to c.1860.

Top right: Longhorn Cow, 1830

Bottom left: The Champion Shorthorn – painting by William Smith, 1856

## Characteristics

<p><b>Disease resistant</b> (less need to treat, fewer deaths)</p>	<p><b>Slower growth</b> (takes longer for the animal to grow and therefore be ready for market)</p>
<p><b>Quick weaning rate</b> (length of time it takes to take a calf from its mother and no longer feed it milk – some calves can be weaned at five months, others as late as 10 months)</p>	<p><b>Grows fast</b> (maturing early means they will be quicker to finish)</p>
<p><b>Breed character: docile temperament</b> (easy to manage)</p>	<p><b>Breed character: wild</b> (challenging to manage, safety risk to themselves and farmers)</p>
<p><b>Efficient meat producers</b> (eat less and put on more weight than another breed)</p>	



## Characteristics that focus on how your cow looks (also relating to genetics)

<p><b>Large</b> (more beef)</p>	<p><b>Short-legged</b> body shape is blocky, square or cylindrical appearances</p>
<p><b>Small</b> (less feed = less cost, fewer maintenance costs)</p>	<p><b>No horns</b> (easier to handle/manage and no need to remove which takes time, reduces injury)</p>
<p><b>Top line of the cow is long and level</b> (the animal is long and strong)</p>	<p><b>Thick hair</b> (excessive sweating uses energy)</p>
<p><b>Looks fluffy</b></p>	

- You may want to consider highlighting the downsides for the cow's welfare like reduced or painful movement. The sire in the art exhibition, Mr Universe, has huge muscle mass grown due a genetic defect. You can revisit the 'Sire' section of this resource together with the photograph of Mr Universe from the Sire online exhibition.
- Note some farmers warn against measuring successful breeding by cow weight alone – farmers should consider the condition of the cow.

# Future Museum object and its label

What stories would you like to read about selective breeding in 50 years from now? What might you *not* want to read? Think of an object or an article to display in this museum in 50 years' time.

Framed collection of 13 rosettes and a prize card for winning poultry, 1978



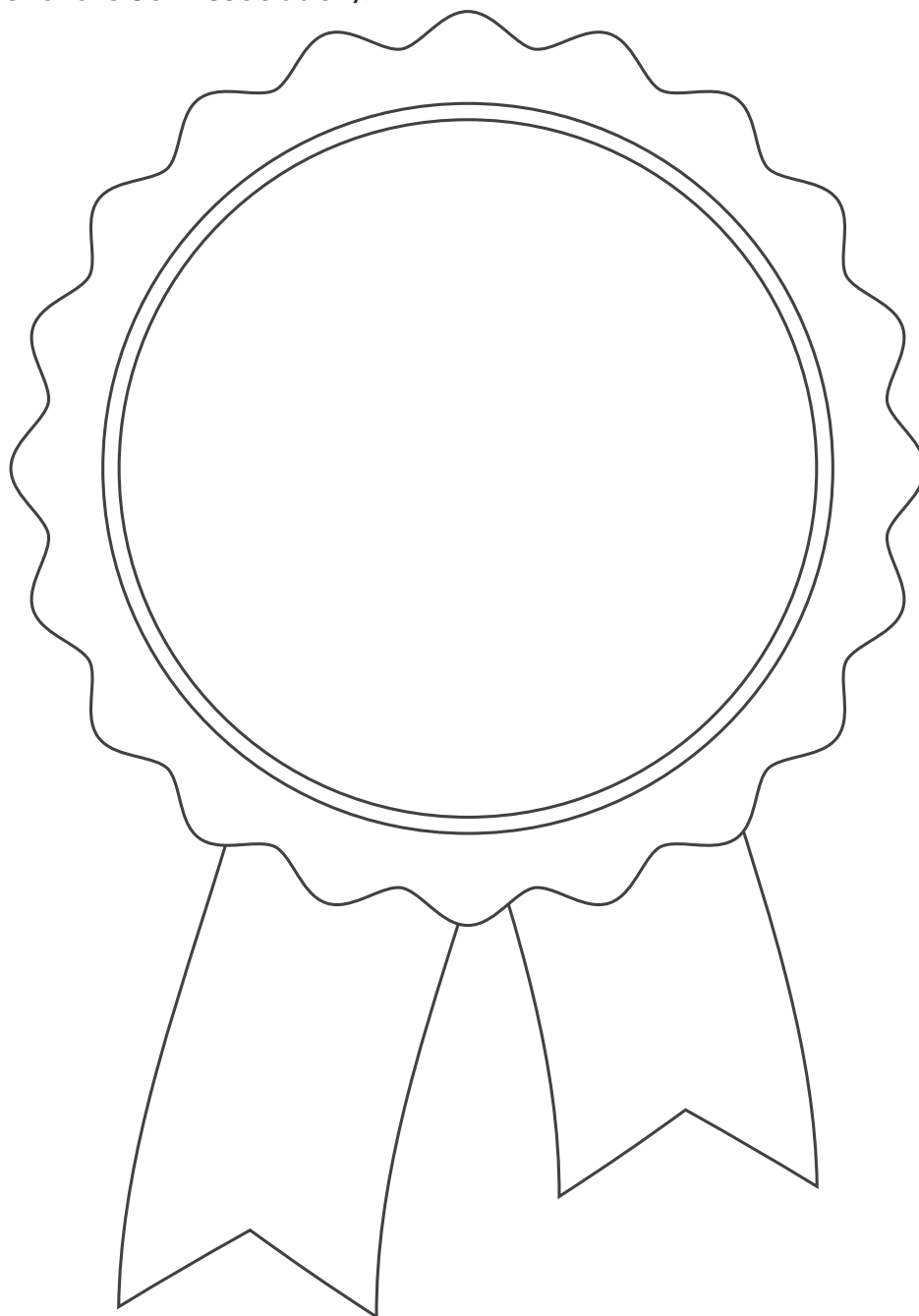


# My Food choices

Look at the examples of these winning rosettes for large fowl then design your own for what you want to consider or change in your diet. Where will you make a small or large 'win' in a sometimes confusing food market? What decisions will you make in your food choices now and choose a statement:

I am winning at...

- finding out where my meat comes from
- campaigning for or considering animal welfare
- eating more organic produce
- being inspired by Eve Balfour (organic farmer and co-founder of the Soil Association).



# The MERL Galleries

