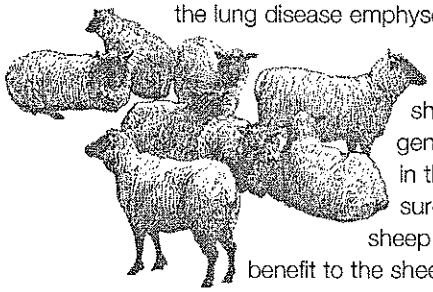
CLASSROOM ACTIVITIES

genetic engineering (1)

Genetically engineering sheep so their milk contains human proteins which can be used in medicine

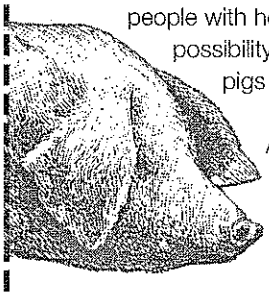
Sheep are being genetically engineered to produce AAT, a medicine which could be used to treat cystic fibrosis, and the lung disease emphysema.



But is it right that sheep and human genes should be mixed in this way? And should surgery be used on sheep which is of no benefit to the sheep themselves?

Genetically engineering pigs so their organs can be used for transplants

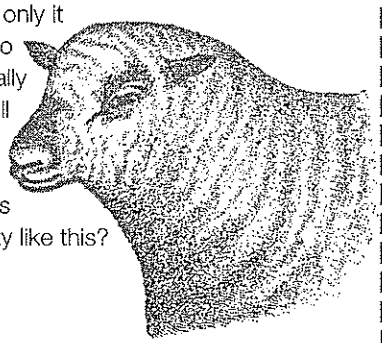
Pig hearts might be able, in the future, to be used to save people with heart disease. But should we risk the possibility of transferring dangerous viruses from pigs into the human population?



And genetic engineering is very unpredictable - what about the experiments on pigs that don't work properly?

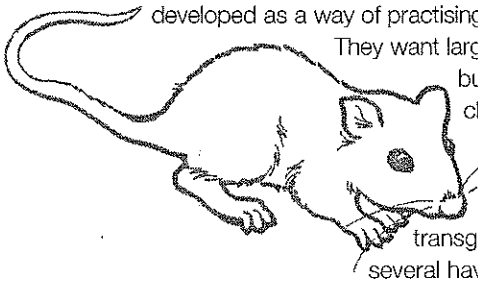
Patenting of animals

If an animal is patented not only it but its offspring belongs to the person who genetically engineered it. This will encourage the commercialisation of genetic engineering. Should animals be treated as property like this?



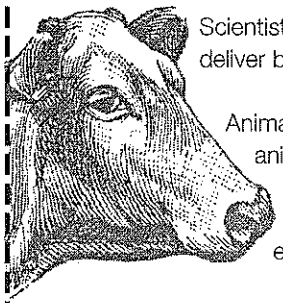
Genetically engineering a larger mouse

This has no use in itself but it was developed as a way of practising the technology. They want larger farm animals, but it is quicker and cheaper to practise on mice.



As with all transgenic animals, several have to be operated on to produce one transgenic mouse. If the procedure is successful it will still have to be repeated on farm animals.

A Ban on Genetic Engineering of Farm Animals

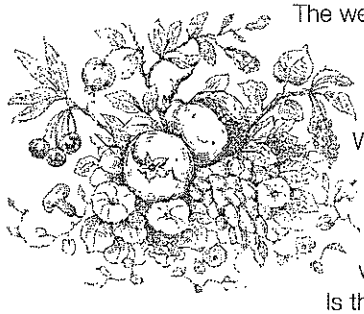


Scientists say that genetic engineering can deliver benefits for mankind.

Animal welfarists say that it can cause animals to suffer.

Should farm animal genetic engineering be banned?

Inserting a gene into soya beans so they are resistant to weedkiller



The weedkiller can then be applied to the crop, killing weeds without killing the crop.

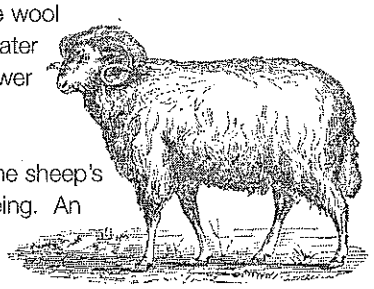
Will it lead to increased use of weedkillers? Could the gene 'escape' from the soya beans into weeds, making weeds immune to weedkiller? Is this a risk worth taking?

CLASSROOM ACTIVITIES

genetic engineering (2)

Engineering a sheep which produces thicker wool

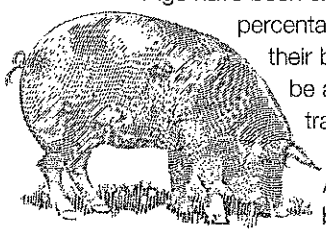
This would increase wool production meaning greater profits for farmers and lower prices for the consumer.



It might interfere with the sheep's metabolism and well-being. An extra thick coat might mean heat stress for the animal; after shearing the greater change in temperature might then result in greater cold stress.

Engineering pigs with the human haemoglobin gene

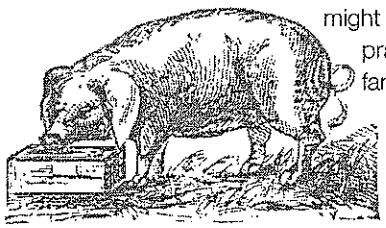
Pigs have been engineered with a small percentage of human haemoglobin in their blood. The idea is to be able to use pig blood for human transfusions.



A great many pigs would need to be experimented upon to develop such a medical technique. There would still be fears of unknown pig viruses spreading to man. If it were successful pigs might need to be kept in sterile conditions with the likelihood that their lives would be barren and dull.

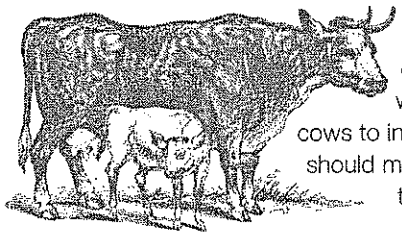
Inserting a growth hormone from cows into pigs so they may grow bigger

It is hoped that this might mean cheaper pig meat. In practice, it hasn't worked so far.



Pigs born with the gene have suffered chronic arthritis and have had to be put down to save them further suffering.

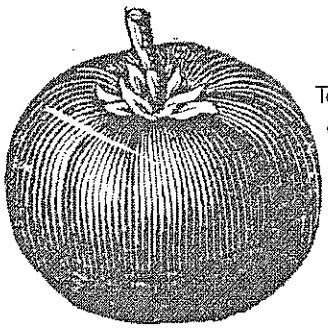
Injecting cows with BST to increase milk yield



Bovine Somatotropin (BST) is a genetically engineered hormone which can be injected into cows to increase milk yield. It should make it easier for farmers to increase milk output.

Unfortunately cows already suffer from the excessive amounts of milk they have been bred to produce and to carry. BST may worsen lameness and mastitis, two conditions associated with high milk yield.

Genetically engineering tomatoes so they ripen more slowly



Tomatoes have been genetically engineered for 'delayed ripening'. It prolongs their shelf-life - but do people really want this?

CLASSROOM ACTIVITIES

selective breeding

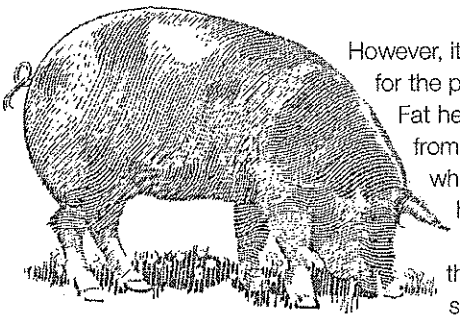
Selectively breeding wheat for a higher yield

Food will be cheaper. It will be easier to feed people in poorer parts of the world.

The new wheats may need greater use of chemicals.

Selectively breeding pigs for leaner meat

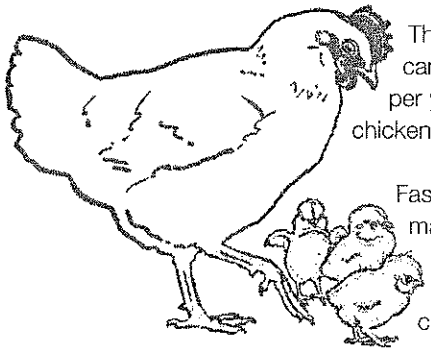
There is a consumer demand for this for health reasons.



However, it may not be good for the pig.

Fat helps insulate the pig from the cold. Changes which affect the homeostatic mechanisms of the pig may cause suffering.

Breeding a chicken to grow faster



This means the farmer can grow more chickens per year. The price of chicken should be less.

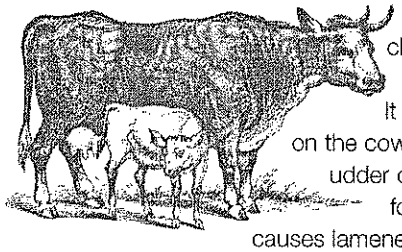
Fast-growing chickens may have trouble standing, suffer from weak hearts and chronic pain.

Breeding chickens without feathers

Some attempts to keep chickens intensively in hot countries have failed because the chickens died in the heat. In fact heat can be a problem in broiler sheds in the UK in mid-summer.

Featherless chickens might be able to survive in the heat. What their life would be like in hot crowded sheds is another matter.

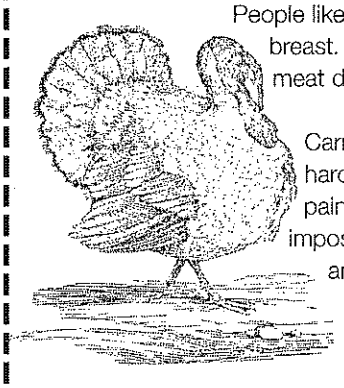
Breeding cows to produce more milk



This helps farmers produce a greater quantity of milk more cheaply.

It places considerable strain on the cow. The weight of milk in the udder can make it difficult for the cow to walk. This causes lameness. Higher milk yields may be associated with mastitis - a painful inflammation of the udder.

Breeding turkeys with larger breasts



People like to eat the white meat of the turkey breast. It helps keep the price of turkey meat down, but the turkey pays the price.

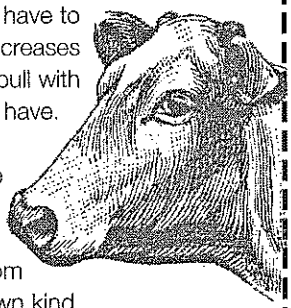
Carrying the extra weight makes it hard for the turkey to walk, and causes painful hip problems. It makes it impossible for the male turkey to mate and means that females have to be subjected to the stress and discomfort of artificial insemination.

CLASSROOM ACTIVITIES

Surgical and Physiological Manipulations of Farm Animals

Artificially inseminating cattle

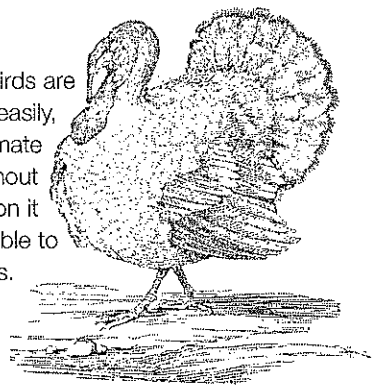
This means the farmer does not have to keep a bull, which is costly. It also increases the number of offspring that a bull with particular characteristics can have.



It means that the cow has to be restrained for an intensive procedure. The bulls kept to produce semen are often isolated from the company of their own kind.

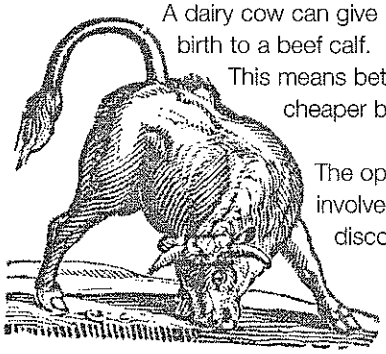
Artificially inseminating turkeys

Large-breasted birds are too big to walk easily, and they cannot mate successfully. Without artificial insemination it would not be possible to breed birds like this.



Transferring embryos into cattle so that the calves produce better beef

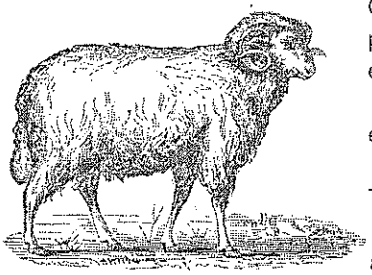
A dairy cow can give birth to a beef calf. This means better and cheaper beef.



The operation may involve pain and discomfort for the cow.

In the UK an anaesthetic is required by law.

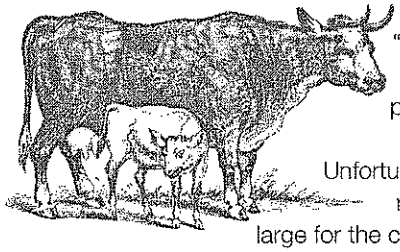
Cloning a Sheep



Quality sheep can be produced to order, and their embryos placed inside a surrogate mother by embryo transfer.

The operation may be stressful for the sheep and cause pain afterwards. All the young could be susceptible to the same diseases.

Breeding cattle which often have to be born by Caesarean Section

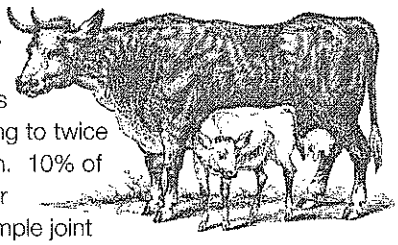


Belgian Blue cattle are "double-muscled" at the back. This means they produce extra meat.

Unfortunately, it means that their rear quarters are often too large for the calves to be born naturally and they frequently have to be delivered by Caesarean Section.

Cloning beef cattle

Steaks are not all the same. If you know a particular cow or bull produces particularly good steak, then the clones should be the same.



But many cloned calves are abnormal, growing to twice the normal size at birth. 10% of cloned calves have other abnormalities, for example joint problems. Cloning also involves subjecting cows to embryo transfer.