

The Jersey Dairy Industry in The Primary Curriculum

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Introduction

Farming is fundamental to us all and nowhere is that more in evidence than in Jersey. Our farms have nearly always included cows but it was in the 18th and 19th centuries, as people moved away from the land that specialisation took place and a dairy industry developed to provide milk for all Islanders and create an internationally renowned breed of dairy cattle.

Jersey Dairy has 14 dairy farms in the island (Sep 2019) with herd sizes ranging from 10 to 400 cows. (See p.6 for the location of these farms.) These beautiful animals in their grassy fields contribute greatly to the island's landscape and environmental well-being, as well as its economy and heritage, and the international status of the cow is a key factor in putting 'Jersey on the map'.

Milk from the island's Dairy herds has been processed at the Jersey Dairy since 1962, providing the island's fresh milk along with UHT milk, cream, butter, cheese, yoghurt and ice cream as well as worldwide exports.

Both the Jersey Dairy and its farms can provide schools with exciting and relevant opportunities to meet objectives in a range of curriculum areas, outlined below. They welcome school visits, which can be tailored to meet the needs of each class, ideally including both a farm and the dairy, so pupils can experience the entire sequence, 'From Grass to Glass.' Much useful work can also be carried out in the classroom using dairy resources.

If you are interested in visiting the Jersey Dairy and/or a dairy farm, please contact Eliza Blanchard: eliza.blanchard@jerseydairy.je

The Royal Jersey Agricultural and Horticultural Society works with schools and young people, to encourage engagement with agriculture and horticulture including 'Facetime a Farmer, 'growing opportunities and the development of the Jersey breed.

Please contact: Jessica McGovern: jess@royaljersey.co.uk

Curriculum Objectives KS 1 and 2

Art and Design

KS1: Using drawing, painting and sculpture to develop and share ideas.

Developing techniques.

Studying different artists – many local artists, past and present have made the Jersey cow a feature of their work. Examples of this can be seen at the dairy and at the RJA next door, if available.

KS2: To create sketch books to record their observations.

Develop techniques and study artists.

Careers

Finding out about Careers and the World of Work:

KS2: Learning how businesses work and the different jobs people do.

Describing the main types of employment in the region and

About safe working practices.

(See p.18 for list of careers or people to meet on a visit, as available)

Computing

KS1: Recognise common uses of IT beyond school (p.29 Cow App)

Design and Technology

KS1/2: explore/investigate and evaluate/analyse a range of existing products. –
(See p.14-15 showing the nature of each type of packaging + 16-21 advertising posters)

Cooking and Nutrition

KS1: Understand where food comes from

KS1/2: Understand the principles of a healthy and varied diet. (See p.19 for nutritional value of milk.)

KS2: Understand seasonality and know where and how a variety of ingredients are grown, reared, caught and processed.

English

Spoken language: listen and respond, ask questions, develop vocabulary etc. (see p.7 – vocabulary)

Reading packaging and information.

Provide a purpose and inspiration for factual, descriptive writing as well as a setting for imaginative writing.

Geography

KS1: Develop knowledge of Jersey.

Use basic geographical vocabulary to refer to the dairy industry (see p.10)

KS2: Understand geographical similarities and differences between animal husbandry in Jersey, a UK region, European region and region in another continent. See p.6 + 10)

Describe and understand the dairy industry and its trade links. See p.12,13,16)

Use maps, sketch maps and digital technologies.

History

KS1: Pupils should learn about changes in living memory, which can be shown at the farm as well as in comparison with Hamptonne etc.

KS2: The curriculum largely concerns prehistory to 1066. There is also an opportunity to cover a theme that extends learning beyond 1066 – this could include farming (see p.8 + 9) but this is most likely to be within the context of the Occupation!

Mathematics

Using mathematics in everyday life. (See p.11 + 17 for 'numbers' & quantities.)

Science

Exploring the world around them, asking questions, observing change.

KS1: Plants: identify and name common plants (grass, maize, barley etc)

Become familiar with names and features of plants and how they grow

Animals: Identify and name common animals, Identifying herbivores etc.

Observing how offspring grow into adults and basic needs of animals

Materials: use of different materials e.g. rubber mats.

Seasonal changes: observe seasonal changes

KS2: Plants: Flowering/non-flowering plants.

Human impact on environments

Animals: The need for skeletons and muscles for support, protection and movement. Start classifying vertebrates etc.

Diets of different animals + digestive system, inc. teeth, stomach etc.

Life processes including reproduction. Gestation periods of different animals.

Weather and impact of seasons.

Rocks: recognise soils made from rocks and organic matter

Electricity: Recognise common appliances running on electricity. Recognise terms current, voltage etc. Understand circuits

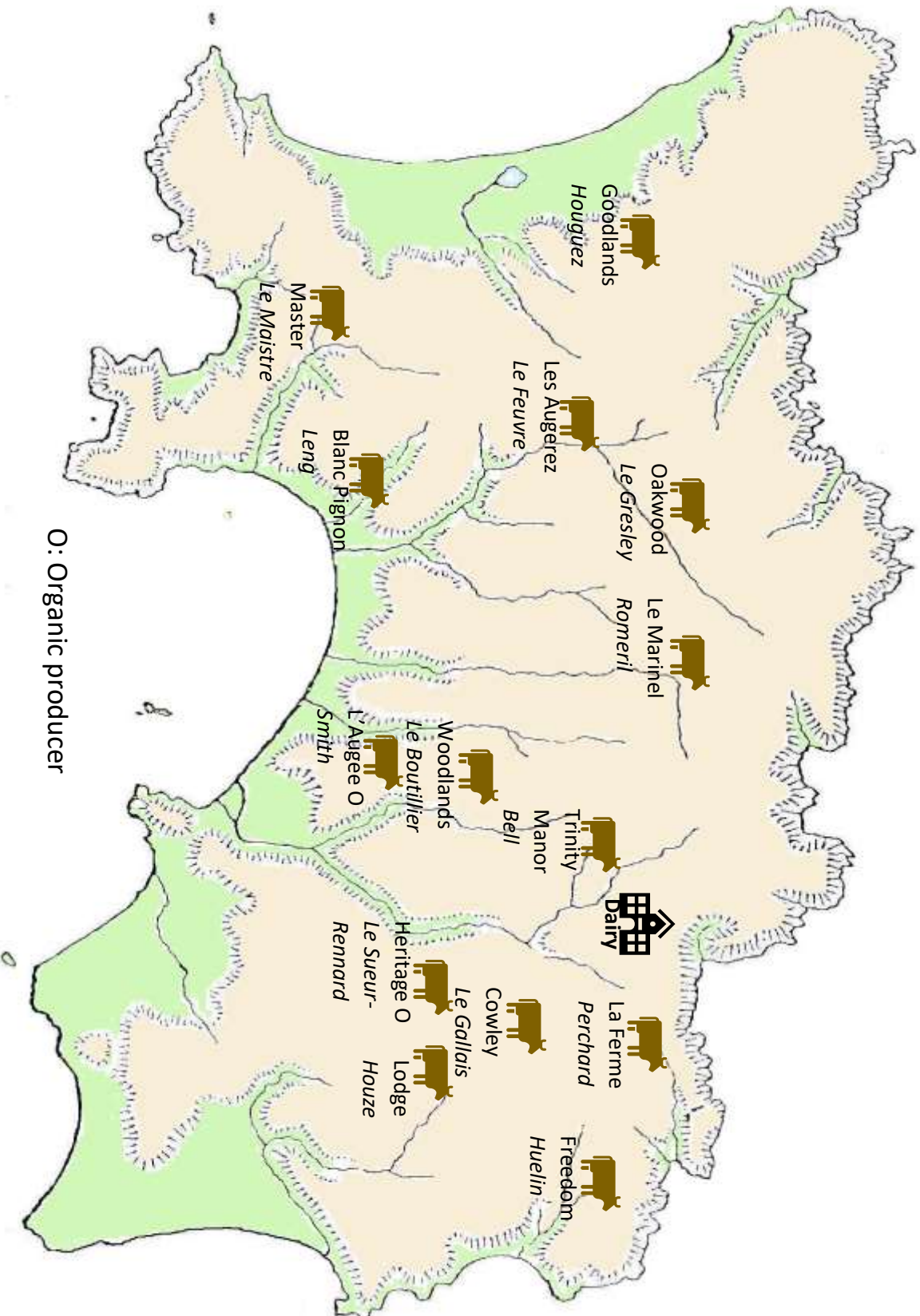
PSHE – Living in the wider world:

Opportunities to explore, clarify and if necessary, challenge, their own and others' values, attitudes, beliefs, rights and responsibilities.

KS1&2: Respect for self and others and the importance of responsible behaviours and actions p.20.

The importance of respecting and protecting the environment p.21-22.

Location of the Island's Co-Operative Dairy farms (Sep. 2019)



Dairy Industry Vocabulary

Cow	Raw milk
Heifer	Butterfat
Calf	Skimmed milk
Bull	
Steer	Fresh Milk
Herd	UHT Milk
Udder	Cream
Teat	Butter
Ruminant	Yoghurt
Artificial Insemination	Ice Cream
Colostrum	
Antibodies	Pasteurisation
Fodder	Homogenisation
Crops	Laboratory testing
Grass	Hygiene
Maize	Production line
Barley	
Silage	
Shed	
Stable	
Cubicle	
Hutch	
Milk Tanker	
Milking Parlour	
Slurry	
Field	
Meadow	
Pasture	
Fertiliser	

The Development of the Jersey Cow

Jersey cows have been genetically linked to the Steppe of southern Russia, but how they came to Jersey is unsure.

c.4,000 BCE/ Neolithic: The first Farmers arrived from Europe bringing crops and domesticated animals including cattle.

c.880: The Viking, Bjorn Ironside, was given the Channel coast and Channel Islands, possibly bringing with him the 500 brown cows from the Anjou region that he had been paid as tribute cf. *Wace*.

1681: Jean Poingdestre recorded Jersey butter as '*very delicate and much esteemed for taste and colour.*'

1763: The importation of live cows from Normandy was prohibited, followed by further laws in 1789, 1826, 1864 + 1878

1790: 1st attempts to improve Jersey cattle by Mr Pepin.

1847: 3 Jersey cows were given to Queen Victoria and taken to Osborne house. In **1871** Pretty Polly started the Windsor herd.

1866: The Jersey herd book started by Cols. Charles Le Cornu and John Le Couteur, breeding animals for identified qualities.

1919: A Jersey bull, Sybil's Gamboge, was sold in America for \$65,000, the equivalent of \$970,000 today.

1951: World Jersey Cattle Bureau formed.

1952: The Jersey Milk Marketing Board was started.

1955: >5,600 milking cows on >1,000 farms

1966: The Dairy opened (moved to Trinity in 2010)

2008: A new law permitted the import of pure Jersey bull semen for breeding and beef semen to produce cattle for beef.

2019: c. 2,500 milking cows on 14 farms

Changes at Woodlands Farm 1857 to 2018

	1857	1986	2019
Area	46.6.5 v	100v	600v
Buildings	<p>Courtyard: Farm house, Press-house, Bakehouse, Pig sties Horse stable Cow stable Hay loft</p>	<p>Courtyard: Farm house with kitchen, Potato store, Workers' housing, Enlarged cow stable with milking machine, hay loft Workshop.</p> <p>West: Manure heap, Bracken and Tractor shed</p>	<p>Courtyard: Farm house + other accommodation.</p> <p>West: Workers' housing Visitor area, Dairy office, Workshop, Cattle shed inc. milking parlour, Young stock shed, Slurry pit, Silage clamps, Machine sheds, Butcher + La Crémère</p> <p>Entrance : Shop and Café</p>
Livestock	[3/6 Cows, 3 Pigs, Hens]	30 cows Hens	270 cows (Hens)
Crops	459 apple trees 33 other fruit trees <i>[grass, wheat, beans, potatoes, parsnips]</i>	Grass, Mangolds, Kale/Rape, Potatoes, Cauliflowers, Anemones,	Grass, Maize, Barley, Fodder Beet, Potatoes, Strawberries.
Workers	<i>[Farmer + family]</i>	Farmer, Herdsman 1 labourer, 6 seasonal workers, contractors	3 Family Farmers 2 Herdsmen Driver(s), Mechanic, 3 farm workers
Machinery	<i>[1 or 2 Horses, Plough, Breezing plough, Horse Van, Milk Cart, Cider crusher and press]</i>	Milking machine, 6 Milk churns, 2 tractors: Box, Trailer, Plough, Scarifier, Roller, Hay tedder, Potato planter, Potato harvester, Cauliflower planter.	X14 herringbone parlour 7,000l bulk tank, Cow 'fit bits' and app. Computerised feeders 4 tractors: Cattle box, Trailers, Plough, Roller, Scarifier, Robot Slurry Scraper, Slurry spreader, Water tanker, Silage cutter, Mower, Tedder, Liner, Baler, Fertiliser spreader, Telehandler, Forklift,

(Power point available illustrating changes)

How a Dairy Farm Works

Inputs	Farm	Outputs
<p>COWS (usually bred on farm)</p> <p>Semen</p> <p>Grass seed</p> <p>Maize seed <i>(to make silage)</i></p> <p>Barley seed</p> <p>Fodder Beet seed</p> <p>Water</p> <p>Fodder Concentrates</p> <p>Bedding</p> <p>Cleaning materials</p> <p>Workers</p> <p>Machines</p> <p>Equipment</p> <p>Computers</p> <p>Vet</p> <p>Contractors</p>	<p>Buildings</p> <p>Fields</p> <p>Tracks</p> <p>Ploughing</p> <p>Slurry spreading</p> <p>Planting</p> <p>Harvesting</p> <p>Storing</p> <p>Feeding</p> <p>Caring</p> <p>Cleaning</p> <p>Tidying</p> <p>Milking</p> <p>Breeding</p> <p>Showing</p> <p>Building</p> <p>Repairing</p> <p>(Attending meetings, Welcoming visitors)</p>	<p>Milk</p> <p>Beef</p> <p>(Cows)</p> <p><i>(+ all the fodder crops grown on the farm, stored and eaten by the cows)</i></p>

Numbers at Woodlands Farm

Milking Cows 270

Calves and heifers 200

Milk average each cow gives per day 23l, 30-35l at peak

Milk average each cow gives per year 7,300l

Temperature of milk in cow 38°C

Temperature of milk in bulk tank when collected <4°C

Acres 270 (c.100 ha, c. 600v)

Fodder concentrates per cow per day 6k

Food each cow eats per day 50k

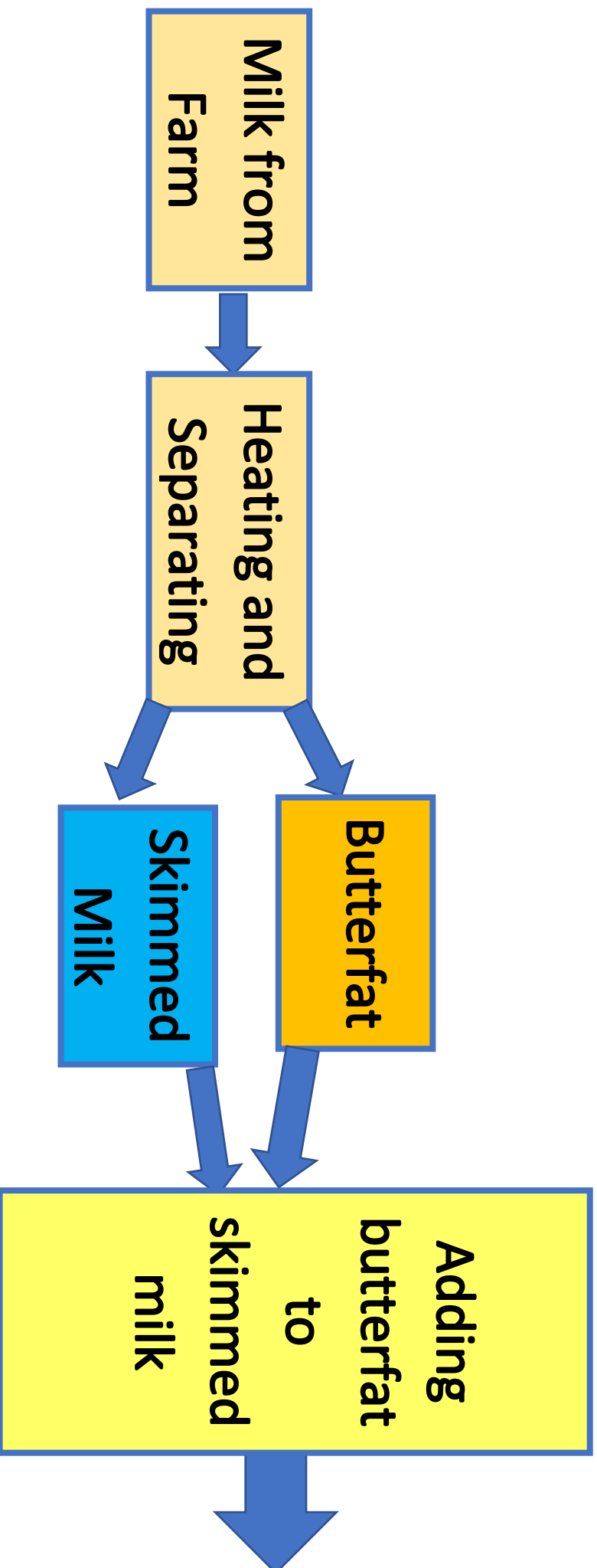
Water each cow drinks per day 50l

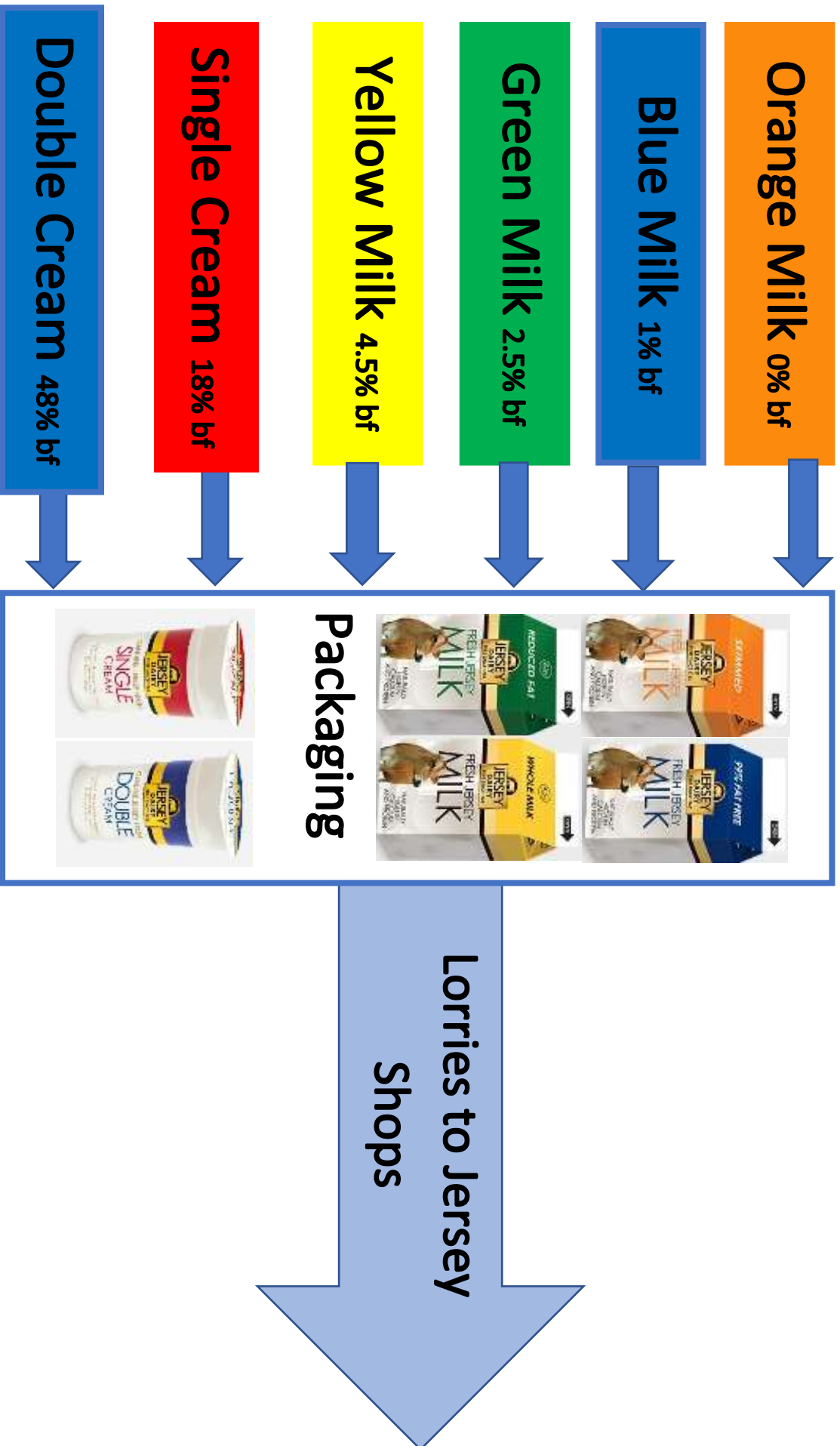
Power of electric fencing 12 volts

Workers 7 (see careers sheet p.6)

Tractors/Machines etc: milking machine, muck clearer, slurry spreader, fodder spreader, 5 feeding stations, 3 massage brushes, 3 tractors, plough, scarifier, silage cutter, cattle truck, water carrier, pick up etc

Processes at Jersey Dairy





Dairy Packaging

Materials

Cartons are provided by Tetra pack, materials differing for each product:

Fresh milk: layers – inc. card and plastic.

UHT products: layers – inc. foil, card and plastic.

Butter: layers – inc. foil and greaseproof paper

Yoghurt cartons: thin plastic + card

Cream cartons: hard plastic (type 6 - polystyrene)

Ice cream tubs: malleable plastic (type 5 – polypropylene)

Design

Colour: Jersey colours for fresh milk: yellow, green, blue, orange

International colours for UHT: blue, green, red

Brand logo: Jersey Dairy

Images for flavourings

Information: Ingredients

Nutritional + Allergy information

Interesting facts (see p.16-21)

Environmental Considerations

Milk Cartons: These come into the Island flat packed and are shaped at the Dairy into the carton that you buy in the shop. Plastic cartons would not come flat packed and would require significantly more

shipping space, thus the cost of getting these to Island would be significantly more both in monetary and environmental terms.

These cartons *are* recyclable but in Jersey the chosen Government policy is to burn them in the energy from waste plant. There would be greater environmental impact to send them abroad for recycling.

The plastic milk cartons used in the UK and elsewhere can't be recycled so would also be burned in the energy from waste plant.

Tetra-Pak is currently working on more easily recyclable packaging for liquids.

A milk carton's lifecycle is closely connected to nature's own natural cycle. When forests are well-managed and trees are replanted, the growing trees emit oxygen and absorb the same amount of CO₂ as they release when burned. As such, the carton's life cycle is, in principle, carbon neutral. Carbon emissions from the beverage carton therefore mostly come from the industrial process connected to the manufacturing and use of the carton.

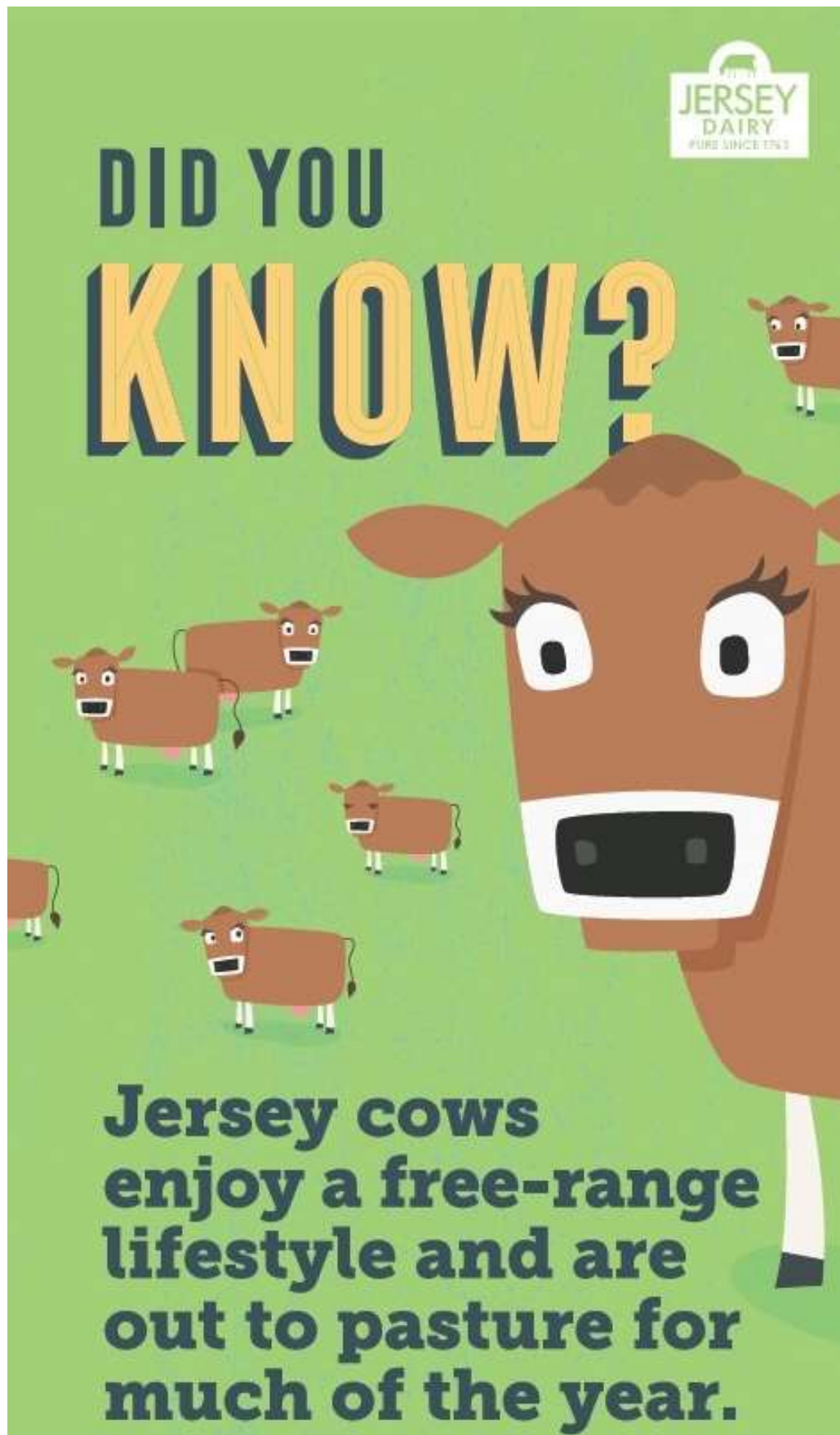
Cream, Yoghurt and Ice-cream tubs: No Plastic tubs and containers are recyclable in Jersey – only plastic bottles etc. made of type 1 plastic, PETE (Polyethylene Terephthalate), the other 5 types of plastic are burnt in the energy from waste plant.

Yoghurt containers can be separated into card and plastic and the card recycled.

'At Jersey Dairy we are committed to minimising our potential impact on the environment by exercising responsible policies in respect of resource efficiency and waste management, minimising our energy and water consumption and raising awareness amongst employees.'

The Managing Director Jersey Dairy

ADVERTISING POSTERS/INTERESTING FACTS



JERSEY DAIRY
PURE SINCE 1763

**DID YOU
KNOW?**

**Jersey cows
enjoy a free-range
lifestyle and are
out to pasture for
much of the year.**

The advertisement features a green background with several cartoon-style brown Jersey cows. One large cow is in the foreground on the right, looking directly at the viewer with large, expressive eyes. Several smaller cows are scattered in the background on the left and center. The text is bold and clear, with the main headline in yellow and blue, and the descriptive text in dark blue. The Jersey Dairy logo is in the top right corner.



DID YOU KNOW?



**From grass
to glass,
we control
every step
of the way.**



Not a single drop of Jersey Milk
is touched by human hands.



DID YOU KNOW?



Drinking Jersey Milk encourages a healthy mind!

The B vitamins it contains support healthy brain function and cell metabolism – it can even help regulate sleep cycles.



DID YOU
KNOW?



**Jersey Milk is
beneficial for the
development of
healthy teeth
and bones.**



**DID YOU
KNOW?**



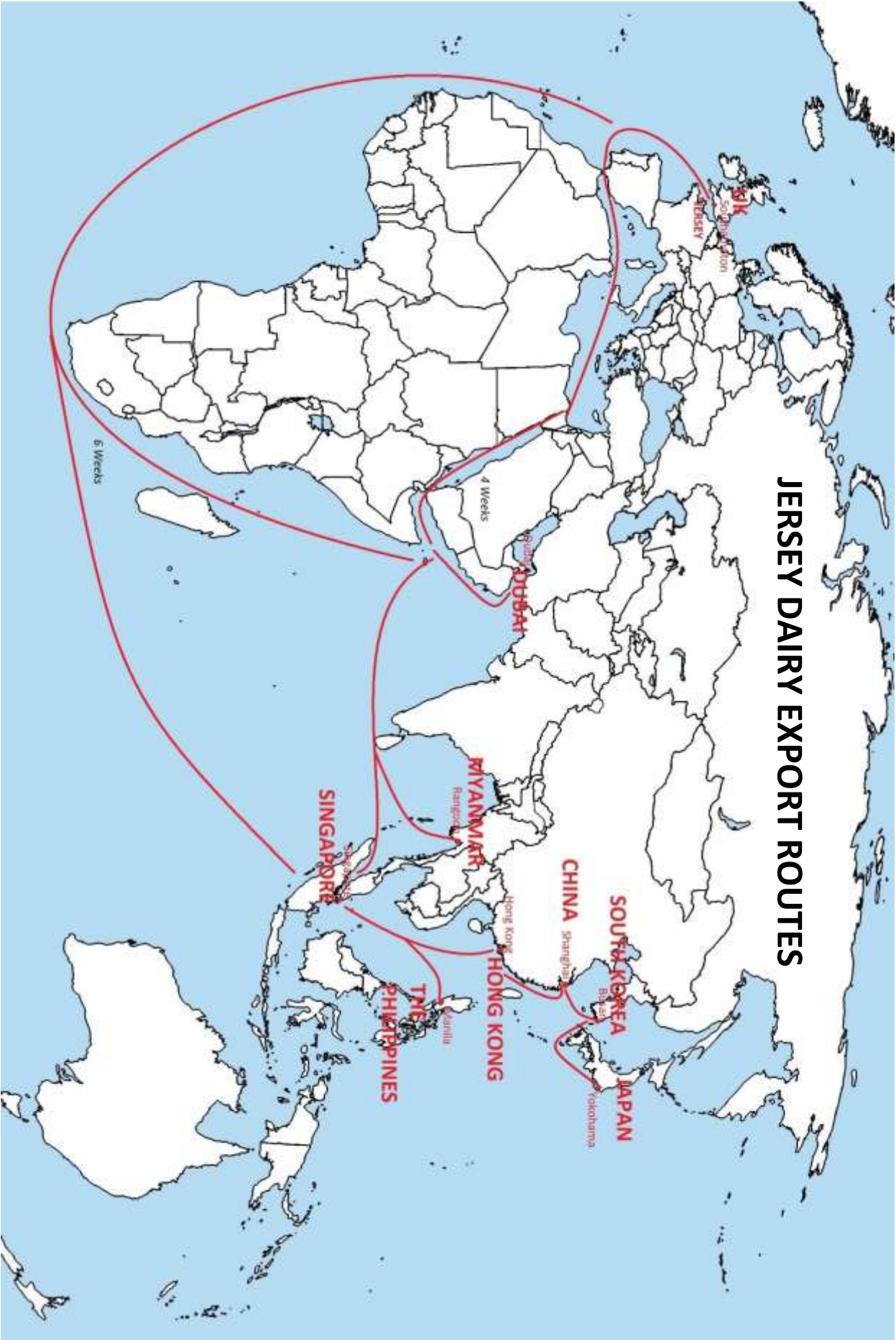
**A 200ml glass of
Jersey Milk has as
much potassium
as a banana!**



**DID YOU
KNOW?**



**Jersey Milk is
better than water
for rehydration!**



Numbers at Jersey Dairy (2018/19)

Farms from which milk is collected 14 (inc. 2 organic)

Milk collected 38,000 l per day (14 million l p.a.)

Fresh Milk produced 146,000 l per week

UHT Milk produced 34,000 l per week

Butter produced 9,500 kg per week

Cream produced 2,600 l per week

Yoghurt produced 2,800 l per week

Ice cream produced 32,500 l per week

Thick shake produced 20,000 l per week

Dairy products consumed in Jersey 9.5 mill. l pa

Exported 4.5 mill. l p.a.

Temperature at which milk is received at dairy 4°C

Temperature for milk pasteurisation 74°C for 32 secs

Temperature for UHT treatment 138°C for 4 sec

Careers in the Dairy Industry

On the Farm

Farmer

Herdsperson

Farm worker

Tractor Driver

Mechanic

Relief Milker

Contractor

Secretary

Vet

At the Dairy

CEO

Finance officer

Marketing officer

Administration

Customer service

Sales

Receptionist

Tanker Driver

Delivery Driver

Production and engineering

Chemist

Lab Technician

Cleaner

Farm support

Milk and Nutrition

Contents	Impact on Health
Water	Hydration, especially post-exercise, milk is more beneficial than pure water.
Protein	Growth and repair of muscles, skin, hair etc. especially in young children and elderly. Mainly A2 protein- easy to digest. A glass of milk has same protein as a banana
Calcium	Growth + maintenance of teeth and bones – help prevent osteoporosis and slow down osteo arthritis. May reduce colorectal + ovarian cancer risks.
Potassium	Reduces heart disease and blood pressure. High potassium intake decreases risk of dying from all causes by 20%
Butterfat	Saturated fat, a source of energy. Contains cholesterol which increases risk of heart disease in older people. Low fat milk has benefits without fat.
Vitamins + Minerals	A for healthy eyes + antioxidant properties. B for growth and brain function – can help to regulate sleep. D helps absorption of calcium.
Lactose	Sugar in milk. May help prevent ovarian cancer. Needs enzyme lactase to digest. Some people do not produce enough so cannot digest lactose.

Diet choices

The milk from each breed of cow varies. Jersey milk is very high, not only in minerals, calcium and protein (20% more than other breeds), but also in Butterfat. (see p.19 Milk and Nutrition)

Butterfat is a good source of energy, but if the human body is not energetic then it is stored as fat, so people need to choose the butterfat level appropriate to their lifestyle. The WHO recommends that:

Children <1 should only consume breast milk

Children Aged 1-5, full fat cow's milk is beneficial.

Children aged >5 semi-skimmed milk c.2% fat is best.

Some people are **lactose** intolerant as they do not have enough of the enzyme lactase which is needed to digest lactose. This means they need milk from which lactose has been removed or milk alternatives.

Human beings are **omnivores** i.e. they *can* eat both vegetable and animal products. A healthy, balanced diet includes a range of foods, all in moderation, to suit a person's lifestyle and their health.

Some people choose **Vegetarian and Vegan** diets for reasons of taste, health or animal welfare.

Taste and health are matters for an individual.

Animal welfare is a matter for farmers, governments and society. It is important to understand what is needed to ensure high standards of animal welfare and both recognise and encourage those farmers and countries who are working to achieve these high standards, as well as act to ensure these matters are addressed in areas where they are failing. Both the Red Tractor and LEAF schemes are used in Jersey to encourage farmers to achieve high standards, see p.21-22. Economics are also important. High standards in everything come at a cost, so this cost must be manageable by the farmer.

Farming and the Environment

Impact of Farming on Jersey:

Land under cultivation covers 52% of Jersey

Farming and Fishing account for 2% of the work force

Agricultural products account for 1.2% of the GDP

Local Dairy farms provide 100% of the fresh milk consumed in Jersey

Environmental and animal welfare standards in the Dairy industry:

Jersey agriculture subscribes to several environmental schemes within its Rural Economy Strategy. These include:

Red Tractor: This includes a dairy section which covers all aspects of the industry in great detail including animal welfare, staff, cleanliness, medicines, safety, buildings, water resources, record keeping etc.

And

LEAF: Linking the Environment And Farming

Jersey's integrated rural strategy required all farms to be LEAF certified by 2019

Integrated Farm Management comprises 9 areas which work together to produce environmentally sound and sustainable farming:

1. Organisation and planning:

Short and long-term planning - where business is going.

2. Soil management and fertility:

Organic matter, structure etc.

3. Crop health and protection:

Minimal use of pesticides and herbicides

Well established and managed crops.

4. Pollution control and by-product management:

Jersey has controls on when and where slurry can be spread and use of chemicals etc. in water catchments areas.

5. Animal husbandry:

Healthy and Happy cows are the best producers.

Importance of 5 freedoms of animal welfare:

Freedom from hunger and thirst – access to fresh water and healthy diet

Freedom from pain, injury and disease – regular checks and appropriate treatment

Freedom to express normal behaviour – social groupings and good grazing.

Freedom from fear and distress – secure and appropriate routines

6. Energy efficiency:

Reduced reliance on fossil fuels.

Aim for optimum production, not maximum

N.B. The Jersey cow is the most energy efficient of all the dairy breeds.

7. Landscape and Nature conservation:

Average land area dedicated to nature should cover 13% of farm

8. Water efficiency:

Efficient use of water

9. Community engagement:

Communicating the work of the farming industry with the local community.

Cow App Technology

Farmers today make great use of technology. The 'Cow App' (via a chip in a cow's ear) allows them to monitor the activity of each cow on their phones 24 hours a day, 366 days a year, and in so doing ensure their cows' health, providing help when needed.

Cows are 'creatures of habit: green denotes feeding. Blue ruminating. red activity. Beige/Yellow low/no activity..

Diag. 1: Daily activity over 1 month. Note the regular pattern, except once a month when the cow is very active. This is when she is on heat, ready to become pregnant.

Diag.2. Hourly activity over a normal day.

Diag.3 Hourly activity over an active day.

