Worksheet 2a

Technology and Innovation Code Breaker

Activity

Scan the QR code or click on the link to watch the video.

Caring for the Environment on a Farm (2:21)

Workstation one: Sustainability on dairy farms

Read

Environmental sustainability means using natural resources (**water, air,** and **land**) in a way that will allow there to be enough available for future generations to use. Technology and innovation are used to improve the sustainability of dairy farms, helping producers to reduce the waste of natural resources and care for the farming ecosystem.

Water is used on dairy farms to clean the areas where cows wait before milking. Effluent water (the water that has been used for cleaning) contains cow manure, which is rich in nutrients similar to compost. This water can be recycled and used to water and fertilise the paddocks. This process helps to reduce waste and save water while giving the soil natural nutrients to help grow pastures for cattle to eat.

Renewable energy, such as **solar panels** and **wind turbines** are used on some dairy farms to power equipment such as the automatic milking systems and the large refrigerated vats used to cool and store milk before it is collected by milk tankers. Solar panels use sunlight to generate electricity, and wind turbines use the wind to produce power. By using renewable energy, dairy farms can reduce their dependence on non-renewable energy sources like coal, which helps reduce greenhouse gas emissions and makes the farm more sustainable.

Worksheet 2a

Technology and Innovation Code Breaker

Activity

Workstation two: Accuracy and efficiency on dairy farms

Scan the QR code or click on the link to watch the video.

How Farmers Use Microchips on Dairy Farms (2:13)

Read

Technology and innovation help to make operations on dairy farms more efficient, which means making work **easier, faster,** and **more accurate**.

Electronic identification (EID) tags are small microchips attached to each cow's ear. These tags are scanned when cows enter and leave the milking shed, sending important data about the cows to the farm's computer system, including how much milk they produce and the type and amount of food they need. This helps dairy producers make more accurate decisions about managing their farm and caring for their cattle.

Automated milking machines, or robotic milking machines, allow cows to be milked automatically without human help. Cows can walk into the milking station when they want, and the machine reads the electronic tag on the cow to start milking. The milking equipment includes cup removers that automatically detach from the cow's teats once milking is complete, preventing harm to the teats. This makes milking faster and easier, giving producers more time to perform other important jobs on the farm.

Worksheet 2a

Technology and Innovation Code Breaker

Activity

Workstation three: Caring for cows

Read

Innovation and technology are used to help farmers care for the cows on their dairy farms.

Automated feeding systems use technology to give each cow the right amount of food based on its needs. By providing the exact amount and type of food each cow needs, these systems reduce waste, keep cows healthy, and help dairy producers notice any changes in a cow's diet that might be a sign that they are sick. This allows farmers and vets to quickly treat any illnesses or injuries cows may have.

Cow brushes are another helpful innovation sometimes used on dairy farms. These large rolling brushes (a bit like the ones at a car wash) are sometimes set up in milking sheds so that the cows can scratch any itches they might have and rub against them to feel calm and comfortable. Keeping cows calm and happy helps improve their health and the quality of the milk they produce.

Scan the QR code or click on the link to watch the video.

How Dairy Farmers Care For Their Cows (2:41)

Worksheet 2a

Technology and Innovation Code Breaker

Activity

Scan the QR code or click on the link to watch the video.

Discover How Milk is Made (2:39)

Workstation four: Safe and healthy milk

Read

Technology and innovation help to make milk safe for consumers to drink and stop milk products from spoiling quickly.

Pasteurisation is a process where milk is heated to 72°C for 15 seconds or longer, then cooled down quickly to kill any harmful bacteria. This makes the milk safe to drink and helps it stay fresh for longer.

Homogenisation is a process that mixes the cream evenly throughout the milk so it doesn't separate and float to the top. This makes the milk smooth and consistent, and it improves its taste and quality.

Refrigeration technology helps to keep milk safe and extends its shelf life (how long it stays fresh after processing). On farms, milk is quickly cooled to below 5°C after milking to prevent the growth of harmful bacteria. **Refrigerated trucks** keep the milk at the same cool temperature during transportation for processing and distribution to retailers (e.g. supermarkets). Consumers need to store milk in their **refrigerators** at home to keep it fresh, safe, and nutritious to drink.

Worksheet 2b

Technology and Innovation Code Breaker Response Sheet

Activity

Visit each workstation and read the fact sheets and watch the videos provided. Answer the questions at each station to reveal the clues. Record your answers and the clues in the spaces provided below. Once you have completed all four workstations, use the clues to crack the final code.

Workstation one: Sustainability on dairy farms

Question	Answer / Notes
Question one: Name two types of renewable energy mentioned that help power dairy farms.	
Question two: What natural resource is recycled after cleaning the areas where cows wait to be milked on dairy farms?	

Code clues	Answer / Notes
Clue one: The sixth letter of the name of the technology that collects energy from the sun.	
Clue two: The second letter of the answer to question two.	

Worksheet 2b

Technology and Innovation Code Breaker Response Sheet

Activity

Workstation two: Accuracy and efficiency on dairy farms

Question	Answer / Notes
Question one: What technology is used to detect each cow's Electronic Identification (EID) tag as it enters the milking shed?	
Question two: What equipment is used to guide cows in different directions after they have been milked?	

Code clues	Answer / Notes
Clue one: The first letter of the answer to question one.	
Clue two: The fifth letter of the answer to question two.	

Worksheet 2b

Technology and Innovation Code Breaker Response Sheet

Activity

Workstation three: Caring for cows

Question	Answer / Notes
Question one: What technology provides cows with the exact amount of food they need to stay healthy? milking shed?	
Question two: Complete the missing word: Cows need to drink approximately 100 __ __ __ __ __ __ of water every day.	

Code clues	Answer / Notes
Clue one: The second letter of the answer to question one.	
Clue two: The fourth letter of the answer to question two.	

Worksheet 2b

Technology and Innovation Code Breaker Response Sheet

Activity

Workstation four: Safe and healthy milk

Question	Answer / Notes
Question one: Complete the sentence: Pasteurisation is a process where milk is heated and then cooled down quickly to kill any harmful __ __ __ __ __ __ __ __	
Question two: What process pushes milk through fine nozzles to ensure it has a smooth and consistent texture?	

Code clues	Answer / Notes
Clue one: The fifth letter of the answer to question one.	
Clue two: The ninth letter of the answer to question two.	
Crack the Code! Use the clues from each workstation to form the dairy industry final codeword. __ __ __ __ __ __ __ __	

Discover Aussie Dairy