FOOD SOLUTIONS

Food Studies Units 1 and 2

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FOURTH EDITION

written
to the new
VCE FOOD
STUDIES STUDY
DESIGN

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• Fully updated case studies and activities increase students’ understanding and awareness of the issues surrounding food supply and consumption
• Builds a foundation of learning for students to live better and pursue further training and employment in food-related industries.

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**THE SAMI**

**GEOGRAPHIC LOCATION**
The Sami are the indigenous people who live in the far northern Arctic and subarctic region of Europe, often referred to as Lapland. The region is very cold, mountainous and treeless.

**LIFESTYLE**
- The early Sami people lived in peat-covered huts.
- The traditional Sami society was based on a system of groups of two or three families living together in what is called a *siida*.

**FOODS**
- **SUMMER**
  - Fish
  - Berries
  - Plants
  - Meat
  - Milk
- **WINTER**
  - Preserved meat
  - Preserved fish

**MBUTI PYGMIES**

**GEOGRAPHIC LOCATION**
The Mbuti people live in the Ituri Forest, a tropical rainforest covering about 70,000 square kilometres of the Democratic Republic of the Congo, in central Africa.

**LIFESTYLE**
- The rainforest, streams and rivers provide for the basic needs of food, fresh water, firewood and clothing.
- The Mbuti live in village groups called bands or kinship groups consisting of between seven and 30 families who each have their own hut.

**FOODS**
- **ANIMAL**
  - Crabs
  - Ants
  - Snails
  - Pigs
  - Monkeys
  - Fish
- **VEGETABLE**
  - Wild yams
  - Termite mushrooms
  - Berries
  - Leaves
  - Honey
THE EARLY DEVELOPMENT OF AGRICULTURE

DOMESTICATION OF ANIMALS
8000–2500 BCE

SELECTION
- Animals selected could survive on food, such as grass, that was not needed by the human population.
- They needed to reach their adult size quickly to become useful to humans.
- A quiet disposition was required, so they didn’t endanger humans or panic when enclosed with other animals.

BREEDING
- The domesticated animals were selectively bred to develop positive traits such as size and strength.

USES
- Domesticated animals provided food, including meat, milk, cheese and butter.
- They were used for pulling farm machinery.
- Skins were used for clothing.

KEY TERMS
CE is the abbreviation of Common Era or Current Era, the calendar era that we use in Australia.
BCE is the abbreviation of Before Common Era; that is, before the year 0.
Chinampas are the plant beds built by the Mayan farmers on floating plots of land.
Cultivate means to deliberately sow and tend crops on nearby land.
Domestication is the process of using selective breeding to make wild plants and animals more useful to humans.

Hunter-gatherer is the term used to describe humans who obtain their food from nature, hunting animals and gathering wild plants.
Sedentary hunter-gatherer communities are groups of people who settled in one place, near a rich food resource.
Swidden farming is an agricultural technique that involves slashing and burning the plants in a forest to create fields to grow crops.
Ancient hunter-gatherer societies

The first humans were nomads who survived by hunting animals and gathering food from wild plants. They moved from place to place, according to the food that was available and the seasons of the year. They followed migrating herds of animals or sought shoals of fish, and gathered nuts, berries and other wild plants. Each day was spent searching for food, making tools such as spears and fishing nets or building shelters so that they could survive.

Hunter-gatherer is the term used to describe humans who obtained their food from nature by hunting animals and gathering wild plants. Ten thousand years ago all humans lived this way. Hunter-gathering was a subsistence lifestyle that provided only the amount of food needed for the people to survive. Hunter-gatherers are sometimes described as foragers, that is, people who obtained food by hunting, fishing or gathering plant matter.

FEATURES OF A HUNTER-GATHERER COMMUNITY

Hunter-gatherers were totally dependent on the natural food available and therefore they were mobile or nomadic, moving on when food supplies in the area were exhausted. Because they were nomadic, they needed to carry all their possessions with them as they moved from one location to another. They also needed to build a shelter when they moved to a new area and so constructed simple shelters with whatever material was available in the new region.

Hunter-gatherer societies tended to be made up of small groups of people, because large communities would quickly exhaust local food supplies. Societies were grouped together by kinship or tribes. The people lived together in cooperative groups, usually without a specific leader, as all men and women, young and old, were considered to have equal power and respect.

Because the group moved frequently in search of wild foods, women could not carry more than one baby at a time. By breastfeeding their children for at least four years, they were able to space births until their children were old enough to walk independently.

TYPES OF FOOD AVAILABLE

Hunter-gatherer societies developed differently depending on the food available in their natural surroundings. Some societies hunted big game or trapped smaller animals, while others fished in lakes.
and rivers or along the coast. They all collected fruit, roots, nuts and seeds depending on what grew in the area. Those hunter-gatherer societies that lived nearer to the equator, where temperatures were higher, depended more on gathering rather than hunting and fishing, which provided much of the food source in temperate regions.

Usually, the men were the hunters while the women and young children undertook the gathering and the domestic tasks. The more gathering of food a society did, the more likely it was to be controlled by the women. By contrast, the more fishing and hunting the group used to obtain their food, the more control the men had in the group. Sharing was a central feature of hunter-gatherer societies, and when the hunter returned with meat, it was shared among the whole group.

**CHALLENGES FACING HUNTER-GATHERER COMMUNITIES**

One of the most significant challenges faced by hunter-gatherer communities was a dramatic change in climate. In approximately 12 900–11 700 BCE, the climate in the northern hemisphere suddenly became much cooler and drier. This change in the climate caused shortages of food and often these nomadic people faced starvation after a natural disaster, such as drought, when there was little food available to forage. In addition, many of the hunters’ first choice of prey, such as big-game species, began to die out when the grazing lands the animals relied on began to disappear as the climate changed.

Hunter-gatherer communities kept strict control over their population numbers to balance the availability of food resources such as animals, fish, nuts and berries with the number of people they could feed. However, as populations grew larger, there was a greater demand for food than the natural landscape could supply. As communities settled and mothers no longer needed to travel constantly with babies and young children, a family’s birth spacing became shorter and communities grew much larger.

**Mbuti Pygmies**

One indigenous hunter-gatherer society is the Mbuti Pygmies who inhabit the Congo rainforests of Africa. These people are hunter-gatherers and are one of the oldest indigenous cultures of the Congo region of Africa. Today, there are approximately 40 000 Mbuti people living in the Congo.

The Mbuti people live in the Democratic Republic of the Congo, in central Africa. The rainforest in which the Mbuti Pygmies live has a dry season lasting for one to two months and a moist, humid climate. There are a number of rivers and lakes throughout the forest region. The rainforest, streams and rivers provide for their basic needs of food, fresh water, firewood and clothing. However, periods of excessive rain or long droughts can diminish their food supply.

**THE MBUTI LIFESTYLE**

The Mbuti live in village groups called bands or kinship groups. The band consists of between seven and 30 families who each have their own hut. The huts are shaped like beehives and are very temporary in structure.

At the start of the dry season, the band goes to the forest to set up a series of camps that allows them to maximise the land area available for foraging. A group or band of people live in a camp for up to a month and then they abandon it as the food supplies begin to diminish.
In the past, the Mbuti used large nets and spears to capture and kill large animals such as buffalo and elephants. The nets were approximately 30–100 metres long and strung end to end to form a large semicircle. Up to 30 nets were used in a game drive. The best hunters were placed in the centre of the circle, and boys guarded the ends while the women drove the animals into the nets. Today, the Mbuti are banned from hunting large animals, but they still hunt small animals such as monkeys and antelope with bows and arrows.

Honey is the most prized and sought-after food product in the forest, and the men often lift the women up into trees to obtain the honey from a hive.

HOW DID THE TRADITIONAL MBUTI OBTAIN THEIR FOOD?

Both women and men gather and forage for food. The women make the nets for hunting and the baskets to carry the food they forage. Hunting is usually done in groups of men, boys and women, who all form a cooperative team to assist in catching the animals. The animal foods available in the rainforest are crabs, shellfish, ants, larvae, snails, pigs, antelopes, monkeys, fish and larger animals such as buffalo and elephants. Other foods found in the rainforest include wild yams, termite mushrooms, berries, fruits, roots and leaves, as well as honey. In some seasons, beans, peanuts, hibiscus and gourds are also foraged and eaten.

The Mbuti construct their huts by drawing a circular outline of the house on the ground. They then make the walls by placing strong sticks in the ground around the circular shape. The sticks are tied together with vine at the top to keep them together and they use large leaves to form the roof.

Mbuti groups have no ruling group and little societal structure. Their society is one in which everyone is considered equal and has the same rights. Men and women have equal power, there is little division of labour and everyone shares in the care of the children. Women are in charge of cooking, cleaning, repairing the hut and obtaining water.

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Honey is the most prized and sought-after food product in the forest, and the men often lift the women up into trees to obtain the honey from a hive.
The Sami

The Sami are indigenous people who live in the far northern Arctic and subarctic region of Europe, often referred to as Lapland. The region covers four countries – Norway, Sweden, Finland and Russia. The Sami peoples’ name for their traditional homeland region is Sápmi. Like the Mbuti, the Sami are a hunter-gatherer community.

The Arctic and subarctic region in which the Sami live is a treeless plain, or tundra. Because of its close proximity to the Arctic Circle, the subsoil is permanently frozen and only hardier plants, such as moss, lichen and low-growing shrubs, are able to survive.

THE SAMI LIFESTYLE

The Sami have lived in this area of far northern Europe since the end of the last ice age, more than 10,000 years ago. They traditionally lived a semi-nomadic way of life and ate a diet that was mainly meat-based, supplemented by berries and herbs with the addition of some fat and reindeer milk.

The early Sami people lived in sturdy peat-covered huts in the winter months, and in tents made from reindeer hide during the summer. The frame of the hut or cot was made from crooked birch trunks that formed arches. Straight poles were secured between the frame posts, and birch trunks were placed around the frame to hold the turf in place. This turf covering insulated the hut from the extremes of the winter. The hut had three windows, and an open fire was situated in the centre of the hut. In more recent times, the Sami used a small iron stove and chimney to provide for heating and cooking.
The traditional Sami society was based on a system of two or three family groups living together in what is called a siida. These siidas worked collaboratively to share the responsibility of providing the food for their families by hunting and fishing together. The area in which the siida hunted and the rivers and lakes in which they fished were tightly controlled and respected by neighbouring family groups. A siida council oversaw a number of small family-based groups and made decisions about whether a particular siida’s territory needed its to be expanded if its family group increased in size. The siida council also helped to resolve conflicts between individuals or neighbouring groups.

**HOW DID THE TRADITIONAL SAMI OBTAIN THEIR FOOD?**

Because the climate of the far northern Arctic and subarctic region of Europe inhabited by the Sami people is too cold, and the terrain too difficult for agriculture, the seasons of the year became the most important factor in determining the food resources that were available.

Spring and summer were the seasons when the Sami could forage and gather plants, berries and herbs. During these warmer seasons, they also fished and hunted by following the migration patterns of the reindeer so that they could build up supplies and store food for the winter months when food was scarce.

Salmon and trout were in plentiful supply in the summer months and were fished in the major rivers that flowed into the Atlantic Ocean. The fish was eaten fresh or salted, dried or smoked, and stored for use when the waterways froze over.

In addition, the Sami ate a lot of reindeer, elk and bear meat, which provided them with a good source of protein. Reindeer meat is rich in minerals and very lean, and the fat was commonly used instead of butter or milk. Just as they preserved fish, the Sami preserved their meat by salting, smoking or souring so that it could be kept for the long winter months.

The Sami made use of the limited edible plants available and these provided them with many essential vitamins. They gathered edible berries, especially blueberries and lingonberries. Cloudberries were also an important food source as they were a good source of vitamin C that was otherwise lacking in such a high meat- and fish-based diet.

The Sami also collected mountain sorrel and used the fleshy leaves to prepare a stew-like dish that was served with milk. Like cloudberries, mountain sorrel is high in vitamin C and was important in preventing diseases such as scurvy. The Sami also gathered the herb angelica and used the tender stalks and roots of the plant. They used angelica in a variety of ways and often simply peeled the roots and stalks and ate them raw or toasted them over a fire. Angelica was also added to reindeer milk, which was then heated, causing it to thicken into a porridge. The milk porridge was then placed in a keg and buried in the very cold mountainous ground where it fermented, enabling the milk to be preserved for use during the cold winter months.
Early development of agricultural food systems

Hunter-gatherer communities began the first attempts at agriculture to decrease the risk and unpredictability of their food supply. In order to care for crops and herds of animals, people needed to live in one place. They began the process of domestication, that is, the process of using selective breeding to make wild plants and animals more useful to humans. These more settled groups became known as sedentary hunter-gatherer communities, that is, groups of people who settled in one place near a rich food resource. These communities started to build permanent settlements close to reliable water supplies, to plant and harvest crops and to domesticate or tame animals such as dogs, goats and sheep. However, historical evidence suggests that it took many hundreds of years for agricultural production to become well established and that these communities developed in parallel with hunter-gatherer communities.

One theory suggested for the move to a more agricultural-based settlement rather than...
a hunter-gatherer lifestyle is climate change. Changes in climatic conditions and the end of the ice age about 10,000 years ago meant that many big game animals such as bison and mammoths could not survive in the more temperate climate. This change in climate meant that there was a dwindling supply of game for human hunters.

These climatic changes also impacted on the distribution and growing patterns of wild grains and other crops on which hunter-gatherers had traditionally depended. As food sources became scarce, tribes began to go to war over the limited food supply. Groups of people that had once been nomadic moved to more temperate regions where they built stronger, permanent homes and surrounded their settlements with walls to protect themselves from other tribes or clans that might try to overpower them. Agricultural development took place in these settlements, which meant that a larger population could be supported and therefore the group would have more warriors to protect them from invading forces.

Once people became more settled they began to cultivate wild plants, that is, to deliberately sow and tend crops on nearby land. Farmers soon discovered which grains gave the best yields and they selected and planted only the best seeds from their last crop. Unlike plants that grew in the wild, domesticated crops were planted in specially cleared plots or seed beds where they had little to no competition from weeds. These crops produced larger clusters of seed heads, which improved their yield and the amount of food that could be produced from the crop. In addition, when they were planted to produce new crops, these larger seed heads germinated more quickly.

As harvests improved, settlements began to produce more food than they needed and so they developed a system for storing the excess grain. This grain was used as the seed for planting future crops or to feed non-farm workers such as craftsmen and women. The farmers also traded their excess grain for various kinds of useful or decorative goods. A stable food supply also meant that nutritional levels increased and so more children were born.

**Domestication of animals**

Living in settled communities meant that farmers could build enclosures to contain and tame wild animals. The domestication of animals occurred at around the same time as the domestication of wild plants, that is, between 8000 and 2500 BCE. Not all animals were suitable for domesticating and farmers only attempted to tame those animals that could survive on food, such as grass, that was not needed by the human population. The animals they chose to domesticate also needed to mature rapidly so that they could reach their adult size quite quickly and become useful to humans. It was also important to select animals that would not endanger their human masters or panic when enclosed, and so animals with a relatively quiet disposition such as sheep, goats, horses, cattle and oxen were selected.

The domesticated animals were selectively bred and they produced offspring, which farmers used to grow larger herds. These animals provided them with food such as meat, milk, cheese and butter or their skins were used for clothing. Animals such as oxen were also bred to help with the heavy agricultural task of pulling a plough.

**Development of agriculture**

As occurred in other parts of the world, the earliest people to live in the region called Mesopotamia were hunter-gatherers. Mesopotamia is a large region that covers much of what is today Iraq and parts of Syria and Turkey. The earliest people who inhabited this region lived in tribes or clans, hunted animals and gathered wild fruit, roots, nuts and berries. The earliest village settlements began to appear in northern Mesopotamia about 10,000–6000 BCE. During this period, communities became more settled as they learnt how to grow and dry grains that could then be ground into flour. They domesticated animals and used them to plough the fields and to provide milk and meat.
One of the other areas of development of early agricultural food systems was in ancient Mesoamerica – present-day Mexico and Central America.

In the era between 50,000 and 10,000 BCE, the people of Mesoamerica were nomadic hunters and gatherers. Gradually, the people of Mesoamerica became sedentary settlers as they began to cultivate wild plants. The cultivation and domestication of these plants allowed them to store surplus food when hunting was poor or during times of drought when food in the natural environment was scarce. The cultivation of wild plants brought these crops closer to their camp sites and made them easier to tend and collect. As sedentary settlements increased and became more permanent, there was a greater reliance on plant-based cultivation and domestication. An important difference between Mesoamerica and Mesopotamia was the domestication process. In Mesoamerica domestication focused on plants, with almost no domestication of animals, whereas in Mesopotamia, both plants and animals were domesticated.

**FACTORS THAT FACILITATED THE DEVELOPMENT OF AGRICULTURE**

The development of agriculture across the globe was largely dependent on the ability of sedentary hunter-gatherer groups to provide a reliable water supply for crops. Locating fertile land, adapting the landscape so that it could be used for crop growing and developing tools for farming were other important factors that facilitated the development of agriculture in Mesopotamia and Mesoamerica.

**Access to water and the development of irrigation systems**

Mesopotamia is a Greek word that means 'between the rivers'. There are two main rivers that flow through this region: the Tigris and Euphrates. The rivers begin in Mesopotamia’s high mountains where rainfall is plentiful. They then rush through the grasslands in the lower reaches of the rivers, which became an important region for growing wheat and herding sheep and cattle.

Sumer, one of the first ancient civilisations, developed along the banks of the Euphrates River in southern Mesopotamia in about 3500 BCE. The area around Sumer was crossed by numerous streams that ran from the Tigris and Euphrates rivers. The land around these rivers and streams was very marshy and needed to be drained so that it could be used as farmland.

Archaeological evidence shows that by 5000 BCE, Sumerian farmers developed an extensive network of irrigation canals and waterways. Large embankments were built along the river’s edge to prevent the water from spilling onto the fields and allowed the Sumerians to create channels to move the water further inland from the river. The area around the river flood plains was very fertile and the water from the irrigation channels allowed them to grow wheat, flax and barley. The Sumerians also used the irrigation channels to water their fruit and vegetable gardens.

In Mesoamerica, agricultural communities in Central America developed irrigation systems similar to those built in Mesopotamia. However, given the mountainous landscape, irrigation systems were difficult to build and maintain; therefore, they were less effective in Mesoamerica than other systems such as swidden farming and terraced farming.
Swidden farming

People living in the Central American region of Mesoamerica during the Aztec and Mayan times used various methods to cultivate their land. Farmers in the rainforests grew maize, beans and squash in fields. They used a system called swidden farming, an agricultural technique that involved slashing and burning the plants in a forest to create fields for cropping. Seeds for the crops were then planted in the ashes left on the forest floor. The soil remained fertile for a few years and then farmers moved on, allowing the area to return to forest. New areas were found and cleared for the next crops.

Terraced farming

One of the greatest challenges to farming in the mountainous regions of Mesoamerica was the lack of flat arable land. Archaeological evidence shows that early Mesoamerican farmers built extensive terraces into the slopes of mountain valleys. Terraces were constructed by building walls of rock or by cutting down large trees and then backfilling the terrace with soil. This terracing allowed farmers to use more of the land than would otherwise have been available to grow their crops; Aztec farmers used terraces to plant maize.

Development of farming tools

Archaeological evidence shows that the Sumerians began to make tools using the locally available clay,
stone and timber to assist them in their farming activities. Pictographs on clay tablets at the end of the fourth millennium BCE, show the use of ploughs in Mesopotamia. These ploughs consisted of a beam-ard, which is a simple machine that scratched a furrow without turning the soil. The land was cultivated by teams of oxen that pulled these wheel-less ploughs and the grain was harvested with sickles. Later, seed ploughs were developed; they consisted of a funnel through which a seed was dropped into the furrow.

Mesoamerican farmers did not use heavy ploughs or horses to help them prepare the land, but only sharp-bladed wooden digging sticks. These sticks, called uictli, were used for planting seeds and hoeing weeds.

**TYPES OF FOOD AVAILABLE TO EARLY AGRICULTURAL COMMUNITIES**

Archaeological records show that maize or corn was grown in Mesoamerica from about 3500 BCE. Maize was considered to be important in the lives of the people of Western Mexico and Mesoamerica because it could be dried and any surplus could be stored for use later in the year. Archaeological relics show the Maize God featured in stone carvings on altars and temples.

As well as corn, many Mesoamerican communities, particularly Mayan, also grew winter squash and climbing beans. These three crops were often grown as companion crops and became known as the ‘three sisters’. Planting the three crops closely together was important as the strong corn stalks provided a natural framework for the beans to climb and the squash covered the surface of the soil and prevented weeds from growing. The beans also worked as a natural fertiliser, adding nitrogen to the soil, and they were a valuable food source with their protein content. The squash or bottle gourd – a relative of today’s pumpkin – was also useful when dried, for collecting seeds for grinding or planting and for carrying water.

Fruit trees were thought to be some of the first plants domesticated and cultivated in Mesoamerica. These trees were highly productive and a good source of food for early civilisations. Another culturally important plant was the cacao plant, which was used for making ancient Mesoamerican chocolate. Cacao beans later became an important commodity used in trade.

In the Mesopotamian city of Sumer, barley and wheat were widely grown along with oats and lentils.
Mesopotamian farmers used selective breeding to develop emmer wheat and einkorn wheat from native grasses. The wild grasses have small seed heads and are difficult to harvest. Emmer wheat became the most widely grown type of wheat as it has larger seeds and therefore provided a higher yield than the einkorn variety.

The Sumerians also developed extensive gardens, and one of the most important crops they grew was dates from the date palms that were indigenous to the region. They also developed extensive gardens by using the shade produced by the palm trees to protect their vegetables and fruit from the hot sun. Some of their most successful crops included peas, beans, lentils, cucumbers, eggplants and leeks, and fruits such as grapes, apples, melons and figs.

**Activity 1.1**

**Taste-testing corn products**

Corn is one of the world’s most important crops and is used widely in food production. **Aim:** To investigate the sensory properties of products made from corn

**Method**

1. Select three or four products made from corn such as canned corn, natural popcorn, corn tortillas and natural corn chips.
2. Place a small quantity of each corn product in separate containers.
3. Taste-test each of the products and record your description of the appearance, aroma, flavour and texture of each corn type. After testing the product, rate it using facial hedonic descriptors.
4. Write up your sensory analysis using technical terminology.

**Results**

Record your results in a table similar to the one on the next page.
Analysis
1. Which product has the strongest corn flavour? What factors would account for this?
2. Explain the impact of high heat on the texture of popcorn.
3. List other uses of corn in the food industry.

Conclusion
Recommend some uses for each of the corn products you have tested and give reasons for your choice based on the findings of your sensory test.

Understanding the text
11. Explain how the first humans provided a food supply for their communities.
12. Suggest reasons why many hunter-gatherer communities gradually developed into agricultural communities.
13. Explain why cultivated crops were likely to give a better yield than wild crops.
14. Outline some important considerations for farmers when domesticating animals.
15. Explain how the Sumerians built irrigation systems to enable them to develop agriculture.
16. Explain the process of swidden farming and why it was an important technique used by early farmers in Mesoamerica.
17. Why did the people of Mesoamerica use terraces as part of their agricultural system?
18. Identify the crops that are included in the ‘three sisters’ and explain why these were important staple crops.
19. Outline the importance of the cacao plant to early agricultural communities.
20. List some of the important foods grown by the Sumerians in their gardens.

THINKING SKILLS
1. Identify and compare the features, advantages and challenges of hunter-gatherer and agricultural food systems.
2. Draw a sketch that symbolises each food system.
3. Identify the food system that you believe is the most reliable in feeding human populations. Justify your answer.

<table>
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<th>TYPES OF FOOD AVAILABLE</th>
<th>ADVANTAGES TO THE COMMUNITY</th>
<th>CHALLENGES IN FEEDING THE POPULATION</th>
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<td>Hunter-gatherer</td>
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OVERVIEW

• Updated for the new Food Studies VCE Study Design
• New, exciting dishes from around the world to complement existing, much-loved recipes
• Each recipe is accompanied by nutritional information to reflect the increased focus on enabling students to understand and own their food decisions
• Fully updated case studies and activities increase students’ understanding and awareness of the issues surrounding food supply and consumption
• Builds a foundation of learning for students to live better and pursue further training and employment in food-related industries.

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