

**CAREER
PATHS**

Agriculture

Book
2

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Express Publishing

Scope and sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Beef industry	Magazine article	beef, cattle, grade, herd, feedlot, grass-fed, feed ration, market weight, processing facility, antibiotics, growth hormone, feed conversion efficiency, rancher	Disagreeing with an opinion
2	Swine industry	Industry Journal	swine, hog, sow, sow farm, static space, dynamic space, social space, litter, farrow-to-nursery farm, farrow-to-finish farm	Agreeing with an opinion
3	Poultry industry	Services Webpage	poultry, intensive farming, free-range, rooster, hen, litter, broiler, roaster, hatchery, pullet, layer, primary breeder, chick	Clarifying information
4	Dairy industry	Webpage	dairy, milking parlor, pasteurize, homogenize, Holstein, heifer, calf, milking herd, udder, milk pipeline, rBST	Giving an opinion
5	Sheep industry	Business Announcement	flock, feeder lamb, market slaughter lamb, accelerated lambing, ewe, lambing period, finishing, distribute, seasonal market, confinement lamb production, range production, predation	Talking about figures
6	Equine industry	Brochure	stall, stallion, mare, broodmare, foal, preventative disease control, vaccination schedule, halter breaking, sacking out, bridling, saddling	Asking about past events
7	Apiculture	Products Webpage	beehive frame, colony, top-bar hive, skep, apiary, smoker, liquid smoke, cold smoke aerosol, honey, honeycomb, beesuit, veil	Recommending something
8	Classification and Composition	Soil Analysis Report	classification, composition, sand, silt, clay, grain, unified soil classification system, coarse-grain, fine-grain, highly-organic, peat, texture	Confirming information
9	Salts and Acidity	Newspaper Article	salinity, acidity, alkaline, sodium, sodicity, salinity, secondary salinity, dryland salinity, pH value, toxic, lime, sulphur	Checking for understanding
10	The nitrogen cycle	Textbook Passage	nitrogen cycle, fixation, mineralization, nitrification, denitrification, nutrient-poor, nitrites, nitrates, eutrophication, nitrous oxide, ammonia	Expressing confusion
11	Soil conservation	Magazine Article	soil conservation, crop rotation, cover crops, green manure, windbreaks, erosion, nutrition depletion, contour farming, keyline design, perimeter runoff control, grassway, land degradation	Describing a place
12	Preparing, seeding, and planting	Farmer's Guide	grain, top soil, fertilizer, amendment, herbicide, soil temperature, seeds per pound, no-till method, tilling method, broadcast seeding, emergence	Introducing a topic
13	Climate and Weather	Seed catalog	hardiness zone, climate, precipitation, temperature, humidity, last frost, long-range forecast, soil moisture, mulch	Asking for advice
14	Pricing	Business Letter	supply and demand, pricing, market, produce, cost of production, pricing for profit, pricing for value, pricing for competition, pricing strategy, direct marketing, indirect marketing	Expressing doubt
15	Government intervention	Newspaper Article	food and fiber industry, market demand, decline, adjusting production, price support, price floor, surplus, foreign trade enhancement, tariff, quota, fallow	Describing cause and effect

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1 Beef industry

Cattle Farmer Monthly June



Is raising grass-fed cattle the way to go?

Marvin Harris

Grass-fed beef is in high demand. Many consumers say it tastes better than grain-fed beef. And they're willing to pay more for it.

The down side of grass-fed beef is the cost. Grasses have a lower **feed conversion efficiency** than corn or soy. Cattle in pastures are also less likely to receive **growth hormones**. Thus, it takes longer for them to gain mass than their corn or soy fed counterparts. Furthermore, they do not receive **antibiotics** and can get sick more easily. Finally, corn-fed **herds** often produce higher **grades** of beef.

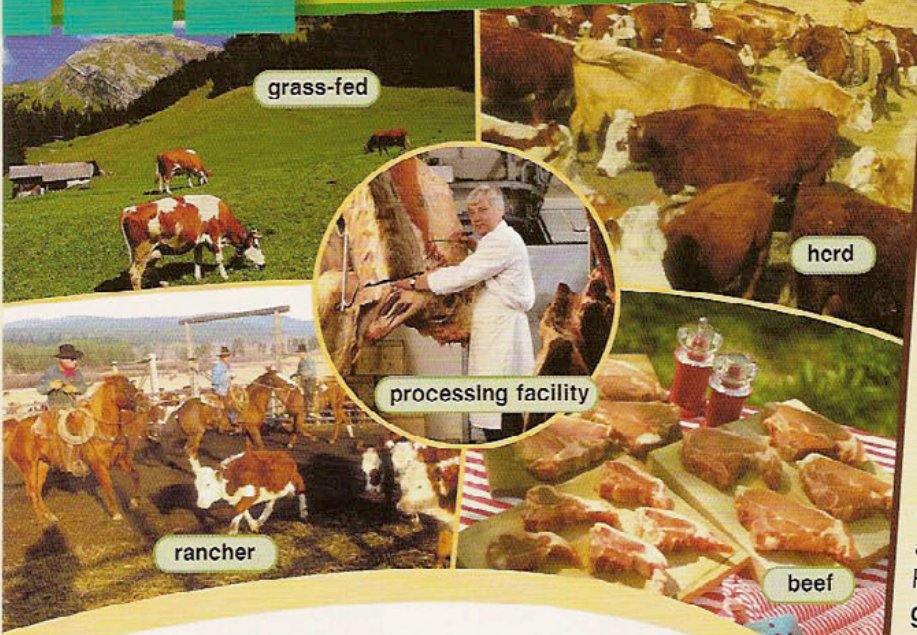
However, there are methods to counteract those shortcomings. Some grass-fed cattle forage in pastures for the first few years of life. Before shipping them to a **processing facility**, **ranchers** send them to a feedlot for **grain finishing**. For approximately six months they receive special **feed rations** to bring them up to **market weight** rapidly.

4 Fill in the blanks with the correct words and phrases from the word bank.

Word Bank

growth hormones
feedlot antibiotics herd
market weight beef

- The cattle in the _____ are bigger than those in the pasture.
- _____ is one of the most popular sources of food for humans.
- Grass-fed cattle take longer to achieve _____.
- Most cattle receive _____ to keep them free of disease.
- _____ help cattle grow more quickly.
- Disease can spread very quickly through a _____ of cows.



grass-fed

herd

processing facility

rancher

beef

Get ready!

1 Before you read the passage, talk about these questions.

- How important is the beef industry in your country?
- What type of meat is most popular in your country?

Reading

2 Read the magazine article. Then, mark the following statements as true (T) or false (F).

- Soy-fed cattle grow faster than grass-fed cattle.
- Grass-fed herds produce higher grade beef.
- Grass-fed cattle do not eat in feedlots.

Vocabulary

3 Match the words (1-8) with the definitions (A-H).

- | | |
|--------------------------------------|---|
| 1 <input type="checkbox"/> rancher | 5 <input type="checkbox"/> feed ration |
| 2 <input type="checkbox"/> grass-fed | 6 <input type="checkbox"/> processing facility |
| 3 <input type="checkbox"/> grade | 7 <input type="checkbox"/> grain finishing |
| 4 <input type="checkbox"/> cattle | 8 <input type="checkbox"/> feed conversion efficiency |

- A a selected amount of food given to an animal
 B a place where animals are butchered
 C cows and bulls
 D a rating of the quality of beef
 E a measurement of how animals convert feed into mass
 F primarily eating grass from a pasture
 G a farmer who raises livestock
 H feeding cattle grain to raise weight before slaughter

- 5 Listen and read the magazine article again. How can farmers get around the problems related to grass-fed beef?

Listening

- 6 Listen to a conversation between a rancher and her assistant. Choose the correct answers.

- 1 What is the conversation mainly about?
- A a drop in beef prices
 - B a mistake with antibiotics
 - C an increase in cattle weight
 - D a change in cattle raising methods
- 2 Why does the man oppose the woman's suggestions?
- A The ranch could lose money.
 - B The grass-fed trend is ending.
 - C The cattle don't need antibiotics.
 - D The cattle won't reach market weight.

- 7 Listen again and complete the conversation.

Assistant: Are you suggesting we switch to 1 _____ - _____ ?

Rancher: I'm thinking about it.

Assistant: I don't think that's a good idea. The cattle will 2 _____ to reach market weight.

Rancher: I understand that. It'll take longer and it'll cost more.

Assistant: I hope you'll 3 _____ .

Rancher: Well, 4 _____ . I'd like to stop giving them antibiotics and growth hormones, as well.

Assistant: That could be a 5 _____ . We could lose a lot of money on sick and small cows.

Rancher: I 6 _____ . But we can also charge a lot more for grass-fed, hormone-free beef.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

Are you suggesting we switch to ...
I don't think that's a good idea.
We can charge a lot more for ...

Student A: You are a rancher. Talk to Student B about:

- grass-fed cattle
- growth hormones
- costs and prices

Student B: You are an assistant to a rancher. Answer Student A's questions.

Writing

- 9 Use the conversation from Task 8 to fill out the rancher's memo. Include the reasons, costs and benefits of switching to grass-fed beef.

Memo: All Staff Jackson Ranch

Soon, we will _____

That's because _____

This means _____

But we can also _____

Let me know if you have any questions.

_____ Owner, Jackson Ranch



2 Swine industry

Journal of Livestock Production
Volume, 12 Issue 4, Spring 2011

Effective Use of Space in Swine Farming

Dr. Carol Braun and Dr. Charles Pierce

Many swine farms do not provide optimal space arrangements (Turner 2009). We studied twenty **sow farms** to learn about the best space arrangements in use today. Below are the findings from our research.

The space requirements are different depending on the type of farm. Nevertheless, it appears important to provide more than the minimally required **static space**. Otherwise, **hogs** tend to be sicker and less productive. In **farrow-to-finish farms**, providing **social space** is advisable. When **sows** have adequate social space they produce healthier **litters**. In the case of **farrow-to-nursery farms**, providing social space does not add additional value. Therefore, we found that it is sufficient to provide adequate **dynamic space**.



Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|----------------|------------------------------|
| 1 ___ hog | 4 ___ dynamic space |
| 2 ___ sow farm | 5 ___ farrow-to-finish farm |
| 3 ___ litter | 6 ___ farrow-to-nursery farm |

- A a group of baby pigs
B a farm that raises female pigs
C enough space for an animal to move
D a farm that raises pigs to market weight
E a pig that has achieved market weight
F a farm that raises pigs until they are weaned

4 Write a word that is similar in meaning to the underlined part.

- The female pig just had another litter. _ _ _
- Larger pens provide space that allows animals to interact with one another. _ o c _ _ s _ _ c _
- The amount of space required to contain an animal's body is not enough; the pig needs room to move. s t _ _ _ _ _ p _ _ e
- Raising pigs and related animals is difficult. _ w _ _ _

Get ready!

1 Before you read the passage, talk about these questions.

- 1 Is the swine industry large in your country?
- 2 What are the challenges of swine farming?

Reading

2 Read the page from an agricultural industry journal. Then, mark the following statements as true (T) or false (F).

- 1 ___ Providing minimal static space leads to healthier hogs.
- 2 ___ Social space is recommended in farrow-to-finish farms.
- 3 ___ Farrow-to-nursery farms only need dynamic space.

- 5 Listen and read the page from an agricultural industry journal again. Why is it better to provide more space for hogs?

Listening

- 6 Listen to a conversation between two swine farmers. Choose the correct answers.

- 1 What is the farmers' problem?
- A There is not enough storage space.
 - B The sow pens have no static space.
 - C The sows have decreased productivity.
 - D The old barn is not big enough for the sows.
- 2 What will the farmers likely do next?
- A increase feed rations
 - B build additional pens
 - C rearrange the sow pens
 - D move animals into the old barn

- 7 Listen again and complete the conversation.

Farmer 1: I'm worried. Our sows aren't as productive as they used to be.

Farmer 2: It started when we changed those pens to storage space.

Farmer 1: Yeah. The sows seem restless with less room to move around.

Farmer 2: You might be on to something. What if we increase their social space?

Farmer 1: I don't know. We don't have much room
1 _____.

Farmer 2: Well, I read an interesting article about this problem. It said social space makes a big difference in 2 _____ - _____ farms like ours.

Farmer 1: I guess we overlooked that when we used those pens for storage.

Farmer 2: Well, we can fix it. Let's get all the storage out of those pens. We can 3 _____ a few other pens so the sows can interact.

Farmer 1: That's not a bad idea.

Farmer 2: But what can we 4 _____ storage?

Farmer 1: I think we can 5 _____ in the old barn.

Farmer 2: 6 _____.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

Our sows aren't as productive as ...
What if we increase their social space?
Well, we can fix it.

Student A: You are a swine farmer. Talk to Student B about:

- sow productivity
- social space
- changing pens

Student B: You are a swine farmer. Discuss your sows with Student A.

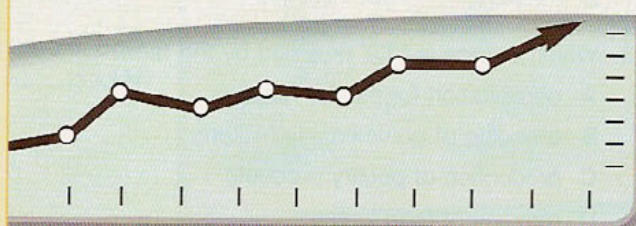
Writing

- 9 Use the conversation from Task 8 to describe the changes to the swine farm. Include what changes will be made and why?

Proposed Changes: _____

Cause: _____

Effects: _____



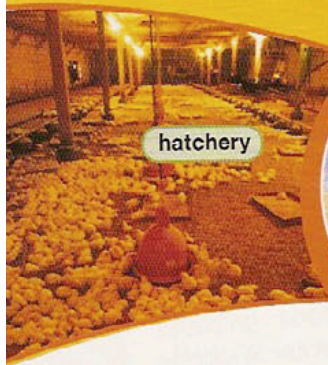
3 Poultry industry



hen



rooster



hatchery



poultry

Cluck Farms



Home | About Us | Our Products | Rates | Contact Us

Welcome to Cluck Farms. We are a **primary breeder** of twenty-seven varieties of commercial chickens.

We provide **hens** and **roosters** to over four hundred operations nationwide. Depending on your needs, we can provide you with chickens ranging from one-week old **chicks** to one-year-old **pullets**.

In addition to breeding, we operate a small production facility. Our **layers** produce only the best eggs. All of our **broilers** and **roosters** are raised in a **free-range** manner.

We are available to consult with **poultry** operations in neighboring states. With sixty years' experience, we can advise you on **intensive** farming methods, free-range techniques, and effective **litter** removal.

Call us today to take a tour of our **hatcheries**.

Get ready!

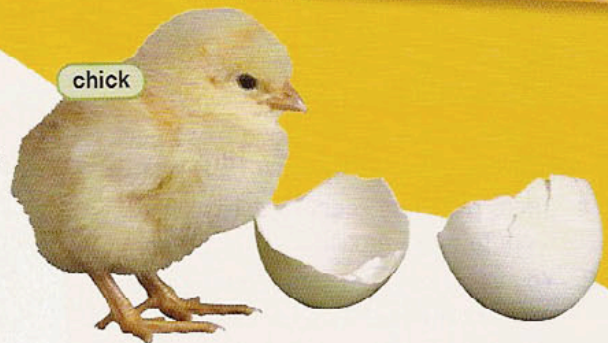
1 Before you read the passage, talk about these questions.

- 1 What products come from the poultry industry?
- 2 How common is poultry in your country?

Reading

2 Read the page from a website. Then, choose the correct answers.

- 1 What is the purpose of the website?
 - A to describe a business
 - B to explain product prices
 - C to compare breeding methods
 - D to give advice on chicken farming
- 2 Which type of chicken produces eggs?
 - A pullets C layers
 - B roasters D roosters
- 3 Which service is NOT provided by the farm?
 - A consultation for nearby farms
 - B breeding of commercial chickens
 - C production of poultry products
 - D removal of farm litter



chick

Vocabulary

3 Match the words (1-7) with the definitions (A-G).

- | | |
|--------------|------------------------|
| 1 __ rooster | 5 __ chick |
| 2 __ layer | 6 __ hatchery |
| 3 __ hen | 7 __ intensive farming |
| 4 __ broiler | |

- A a baby chicken
- B a female chicken that produces eggs
- C a female chicken
- D a male chicken
- E a facility where eggs are hatched
- F a medium-sized chicken sold for food
- G a method for raising chicken indoors

- 4 Fill in the blanks with the correct words and phrases from the word bank.

Word BANK

free-range roasters primary breeder
poultry litter pullets

- 1 _____ chickens exercise more than confined chickens.
 - 2 _____ is the waste produced in a coop.
 - 3 Robert's Farm is the _____ for most local farms.
 - 4 Chicken is a major _____ product.
 - 5 _____ cost a lot because they are so big.
 - 6 Those _____ will be layers soon.
- 5 Listen and read the page from a website again. Apart from breeding, what other services does Cluck Farms provide?

Listening

- 6 Listen to a conversation between a breeder and a farmer. Mark the following statements as true (T) or false (F).
- 1 ___ The farmer wants advice on raising free-range chickens.
 - 2 ___ The breeder recommends two chicken breeds.
 - 3 ___ The farmer will buy a dozen roosters.

- 7 Listen again and complete the conversation.

Farmer: Hi, I'd like to order some chicks.

Breeder: Is there a particular breed you're interested in?

Farmer: I'm 1 _____. I have a small farm, and I'd like to raise a dozen or so chickens 2 _____.

Breeder: Well, we have a few good 3 _____. Meat or egg production?

Farmer: Could you 4 _____?

Breeder: Are the chickens going to be used for meat or egg production?

Farmer: 5 _____. I want the hens to lay eggs for a few years. But I'll occasionally slaughter them for meat. Maybe one or two a year.

Breeder: In that case, I'd recommend Iowa Blue or Delaware. Both produce excellent eggs and grow into 6 _____ quickly.

Farmer: Did you say roosters or roasters?

Breeder: Roasters. Both breeds can grow rather large. They make good roaster chickens.

Farmer: Oh, I see. Well then, I'll take a half dozens chicks of each.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

Hi, I'd like to order some chicks.

Are the chickens for meat or egg production?

I'll take a half dozen.

Student A: You are a breeder. Talk to Student B about:

- production
- types of chicks
- chick growth

Student B: You want to raise chickens. Talk to Student A about which type to buy.

Writing

- 9 Use the conversation from Task 8 to fill out the order.

Cluck Farms 

Customer Name: _____

Chicks for: Meat / Egg

Breeds: _____

Number of Chicks: _____



4 Dairy industry

Get ready!

- 1 Before you read the passage, talk about these questions.
- 1 What dairy products are popular in your country?
 - 2 How has technology changed dairy production?

Reading

- 2 Read the page from a website. Then, mark the following statements as true (T) or false (F).
- 1 ___ The dairy receives calves from a breeder.
 - 2 ___ The dairy produces more than milk.
 - 3 ___ The milk at the farm is tested for rBST.

Vocabulary

- 3 Fill in the blanks with the correct words and phrases from the word bank.

Word BANK

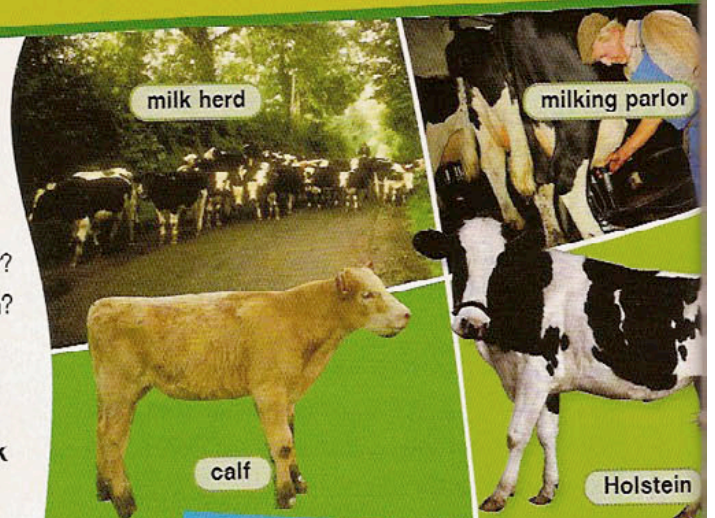
homogenized Holstein udders
rBST milk pipeline

- 1 Most people prefer milk that is _____.
- 2 Machines pull milk from cows' _____.
- 3 _____ makes cows produce more milk.
- 4 The _____ carries milk to storage.
- 5 _____ cows are known as great milk producers.

- 4 Match the words (1-6) with the definitions (A-F).

- | | |
|--------------|----------------------|
| 1 ___ dairy | 4 ___ milking parlor |
| 2 ___ heifer | 5 ___ pasteurize |
| 3 ___ calf | 6 ___ milking herd |

- A a female cow that has not given birth
 B food made from milk
 C an area where cows are milked
 D to heat milk in order to kill bacteria
 E a group of cows that produce milk
 F a baby cow



Colchester Family Dairy Farm

About Us

Colchester Family Dairy Farm is located in Berville, Ohio. Founded in 1882 by Roger Colchester, our farm is still run by the Colchester family.



Our facilities - Our main barn houses a **milk herd** of 75 **Holsteins**. In addition, we have a nursery barn where bull **calves** and **heifers** are raised until they are sold. The milking machines in our **milking parlor** are the best available. They can send fifty gallons a minute from **udders** to storage through our **milk pipeline**.

What we do - Our farm produces milk and milk products, none of which contain **rBST**. We sell four varieties of milk and make our own cheese and butter.

Our commitment to quality - Every gallon of milk produced at our farm is **pasteurized** and **homogenized**. We test each batch for quality. If it doesn't pass our rigorous testing, we don't sell it.



5 dairy

- 5 Listen and read the page from a website again. What happens to milk that has passed through the pipeline?

Listening

- 6 Listen to a conversation between two dairy employees. Choose the correct answers.

- What is the problem with the heifer?
 - She does not produce enough milk.
 - She is too old to have a calf.
 - She is underweight for a milk cow.
 - She does not get enough to eat.
- When will the heifer move to the milk herd?
 - when her calf is weaned
 - when she gains weight
 - when she is healthy again
 - when she gets old enough

- 7 Listen again and complete the conversation.

- Employee 1:** I think it's time for this heifer to leave the nursery barn.
- Employee 2:** Really? Do you think she's ready to join the milk herd?
- Employee 1:** I do. She's been in the heifer herd for a pretty long time.
- Employee 2:** That's true. But I don't think she's ready to have a calf.
- Employee 1:** Why do you say that? She's almost two years old. That's the right age, if you ask me.
- Employee 2:** Well, age is important, but it's not 1 _____. Have you weighed her lately?
- Employee 1:** No, I haven't. Is there a problem 2 _____?
- Employee 2:** It's not a problem, exactly. It's just that she's not quite 3 _____ to join the milk herd.
- Employee 1:** 4 _____. But we need to get her weight up, then. Have you increased her feed rations?
- Employee 2:** No, we haven't.
- Employee 1:** Let's start with that. If we can get another twenty or thirty 5 _____, we'll move her into the milk herd. 6 _____?
- Employee 2:** Yes, that's a good plan.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

I think it's time this heifer ...
I don't think she's ready to ...
If we can ... we'll ...

Student A: You are a dairy farmer. Talk to Student B about:

- moving a heifer to the milk herd
- heifer age and weight

Student B: You are a dairy farmer. Talk to Student A about moving a heifer to the milk herd.

Writing

- 9 Use the conversation from Task 8 to write a plan to move the heifer.

Heifer 1187

Age: _____

Weight: _____

Goal: _____

Changes: _____

Will move to milking herd when: _____

5 Sheep industry

Cloudhaven Sheep Farm



Galton Industries is proud to introduce our newest venture, the Cloudhaven Sheep Farm. Building on our success with the Cloudhaven Cattle Yard, we have created a lambing facility that offers the same quality production. Cloudhaven oversees three **flocks**, combining for a total of approximately 3,000 head of sheep. We supply both **feeder lambs** and **market slaughter lambs**. Thanks to our **accelerated lambing** process, we can meet the demands of any customer, large or small. Our **ewes** produce one to two lambs per year. During each **lambing period**, we keep half of the lambs for **finishing**. The others are **distributed**

to meet **seasonal market** demands.

This is all made possible by our system of **confinement lamb production**. Our experienced managers ensure the safety and quality of lambs inside our facility. Not only does this process increase quality, but it also helps keep our costs down. Unlike **range production** operations, confinement production means we have zero losses to **predation**. And we pass those savings on to our customers. So, come see us at Cloudhaven Sheep Farm for quality sheep at low prices.

Get ready!

1 Before you read the passage, talk about these questions.

- How is raising sheep different from raising cattle?
- Are sheep raised mostly for meat or wool in your country?

Reading

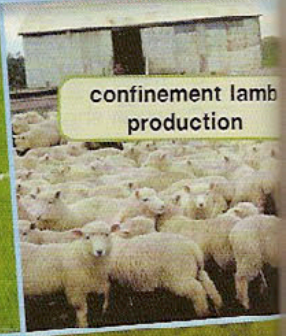
2 Read the business announcement. Then, choose the correct answers.

- What is the passage mostly about?
 - a takeover of a failing sheep operation
 - the advantages of range production
 - the success of a cattle operation
 - the operations of a new facility
- What was the company's previous business venture?
 - a cattle yard
 - a slaughterhouse
 - a free range poultry operation
 - a meal processing facility
- What is the advantage of confinement lamb production?
 - production of more lambs
 - no predation losses
 - accelerated lambing process
 - better market prices

range production



confinement lamb production



ewe



flock



lamb

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|-------------------|-----------------------------------|
| 1 ___ flock | 5 ___ market slaughter lamb |
| 2 ___ ewe | 6 ___ confinement lamb production |
| 3 ___ distribute | |
| 4 ___ feeder lamb | |

- a large group of domesticated sheep
- a method for raising sheep indoors
- a lamb that is sold to be slaughtered
- a lamb that is sold for finishing
- to supply goods to shops to be sold
- a female sheep

4 Read the sentence pair. Choose where the words best fit the blanks.

1 seasonal market / accelerated lambing

A The farm produced more lambs for the _____.

B Weak ewes cannot participate in _____.

2 lambing period / finishing

A Lambs are put up for sale after _____.

B Ewes need extra care during the _____.

5 Listen and read the business announcement again. What happens to the lambs during the lambing period?

Listening

6 Listen to a conversation between a customer and a sheep farm employee. Mark the following statements as true (T) or false (F).

1 ___ The woman wants market slaughter lambs.

2 ___ The sheep farm cannot complete orders over 300 lambs.

3 ___ Lamb prices are determined by weight.

7 Listen again and complete the conversation.

Employee: Cloudhaven Sheep Farm. This is Michael speaking. How can I help you?

Customer: Hi, Michael. My farm is expanding operations, and we're looking to get some 1 _____.

Employee: Well, we can certainly provide that. About how many animals are you 2 _____?

Customer: I'd like 3 _____ 300 head. Can you complete an order that large?

Employee: 4 _____. We try to keep a steady population of about 3,000. Of course, only 4 of those are feeder lambs. The rest are 5 _____.

Customer: I see. Well, 6 _____. In that case, let's talk about prices.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

*My farm is expanding. We're looking to get ...
Can you complete an order that large?
Let's talk about prices.*

Student A: You want to purchase sheep for your farm. Ask Student B about:

- the type of lambs you want
- the number of lambs
- prices

Student B: You are a sheep breeder. Answer Student A's questions.

Writing

9 Use the conversation from Task 8 to fill out the receipt.

Cloudhaven
Sheep Farm



SALES RECEIPT

Customer Information

Name: _____

Farm: _____

Order Details

Lamb Type: _____

of Lambs: _____

Price per pound: _____

6 Equine industry



SHADY STABLES

Shady Stables is East City's premier equestrian facility. Our ten-acre property features two barns with eight **stalls** in each. Every stall is connected to a private run. We board **stallions** and **mares** for a small monthly fee that includes feed and access to all our riding areas as well as local riding trails. We also have private boarding areas for **broodmares** and **foals**. In addition to our boarding services, we have an on-site veterinarian to meet all of your horse's needs including **preventative disease control**. Routine care includes foot and dental exams and a comprehensive **vaccination schedule**.

Shady Stables also offers professional training services. Our trainers can assist you with everything from **halter breaking** and **sacking out** to **bridling** and **saddling**. Each trainer has a minimum of five years' experience training horses. They also offer private riding lessons for inexperienced riders.

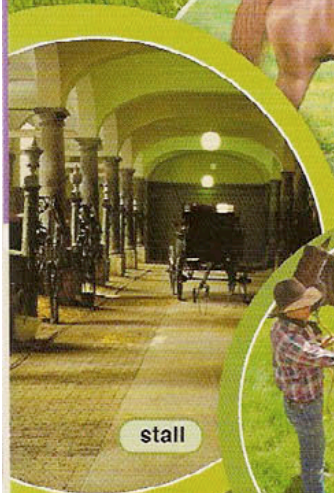
Call Shady Stables today to learn more about our facilities and staff.



stallion



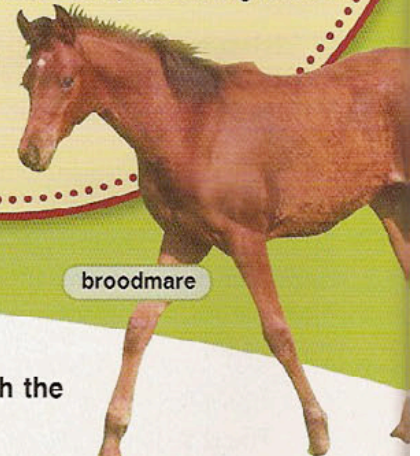
foal



stall



saddling



broodmare

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What role have horses played in agriculture in the past?
- 2 How are horses used in your country today?

Reading

2 Read the brochure from a horse stable. Then, mark the following statements as true (T) or false (F).

- 1 ___ The monthly boarding fee includes food.
- 2 ___ The facility is near a veterinary clinic.
- 3 ___ Trainers have years of experience teaching new riders.

Vocabulary

3 Match the words (1-7) with the definitions (A-G).

- | | |
|----------------|------------------------------------|
| 1 ___ bridling | 5 ___ mare |
| 2 ___ foal | 6 ___ halter breaking |
| 3 ___ stallion | 7 ___ preventative disease control |
| 4 ___ saddling | |

- A training a horse to be led by a halter
- B a baby horse
- C a female horse
- D training a horse to accept a saddle
- E training a horse to accept a bit
- F a male horse
- G activities that prevent illnesses

4 Write a word that is similar in meaning to the underlined part.

- 1 The female horse used for breeding is pregnant again. br _ _ _ _ a _ _
- 2 Training a horse to not fear objects that humans place on it can be dangerous. _ a _ k _ _ _ _ u _
- 3 The veterinarian created a planned administration of vaccinations. _ _ c c _ _ _ t _ _ _ _ _ c h _ _ _ _ _
- 4 Clean the small partitions inside a barn. _ t _ _ _ _

- 5 Listen and read the brochure from a horse stable again. What service do they offer for less experienced riders?

Listening

- 6 Listen to a conversation between two horse trainers. Choose the correct answers.

- 1 What did the woman do with the mare?
 A bridled her
 B saddled her
 C sacked her out
 D rode her
- 2 What will the woman do tomorrow?
 A give the mare a shot
 B talk to the veterinarian
 C check the vaccination schedule
 D put a saddle on Snowflake

- 7 Listen again and complete the conversation.

- Trainer 1: Did you work with Snowflake today?
 Trainer 2: I did. And 1 _____, I think she's one of the best mares we've got.
 Trainer 1: Really? Why do you say that?
 Trainer 2: Well, just yesterday I started 2 _____. She didn't seem scared at all when I put the blanket on her.
 Trainer 1: That's rare. 3 _____ today?
 Trainer 2: The same thing happened today. You know, I think she might be ready for 4 _____.
 Trainer 1: Have you 5 _____ yet?
 Trainer 2: No. I guess I should probably work on that before I try to 6 _____.
 Trainer 1: Definitely. And that reminds me, she needs to see the vet.



Speaking

- 8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

Did you work with ... today?
I think she might be ready for ...
She needs to see the vet.

Student A: You are a horse trainer. Ask Student B about:

- a mare
- training
- vaccination

Student B: You are a horse trainer. Answer Student A's questions.

Writing

- 9 Use the conversation from Task 8 to fill out the training log.

RIDER'S STABLES TRAINING LOG

Horse: _____

Trainer: _____

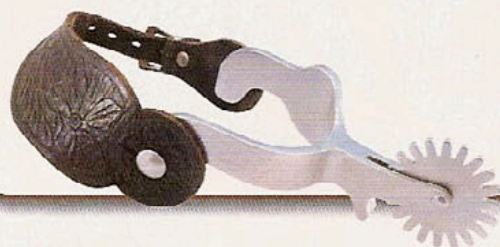
Date: _____

Training completed: _____

Trainer assessment of horse: _____

Next training: _____

Medical status of horse: _____



7 Apiculture



Home About Us Products Orders Contact

Sweet Rewards Beekeeper Supply

Whether you're considering beekeeping as a hobby or a career, Sweet Rewards Beekeeper Supplies has everything you need. We carry a wide selection of **beehive frames** to house your **colony**. From **top-bar hives** to traditional **skeps**, we have hives for any type of **apiary**.

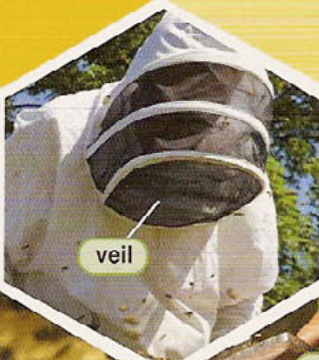
In addition to hive frames, we also carry a complete line of beekeeper tools. We have several sizes of **smokers**, as well as **liquid smoke** and **cold smoke aerosols**. When it's time to harvest **honey**, take advantage of our new line of honey jars. We even serve beekeepers who prefer traditional methods. For these customers, we carry **honeycomb** presses.

Finally, no beekeeping operation is complete without protective gear. We have **beesuits** in a variety of sizes and designs including square veils, round veils, and shoulder veils.

Stop in today and see what makes Sweet Rewards the first choice for professional beekeepers.



beesuit



veil



honey



honeycomb press



smoker



top-bar hive

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What challenges do beekeepers face?
- 2 Why is beekeeping important today?

Reading

2 Read the webpage. Then, choose the correct answers.

- 1 Which product do bees live in?

A apiary	C beehive frame
B beesuit	D honeycomb press
- 2 What is true of the honeycomb press?

A It protects beekeepers.	B It supports large colonies.
C It is preferred by professionals.	D It is used by traditional beekeepers.
- 3 What does the store NOT sell?

A bee colonies	C harvest equipment
B smoking tools	D protective clothing

Vocabulary

3 Read the sentence pair. Choose where the words best fit the blanks.

- 1 **apiary / beesuit**

A This _____ produces a lot of honey.
B A good _____ protects beekeepers' skin.
- 2 **liquid smoke / colony**

A Wendy's _____ lives in a top-bar hive.
B _____ is a good option for people who dislike the smell of smoke.
- 3 **veils / skeps**

A There are many types of protective _____.
B Traditional beekeepers use _____.

4 Match the words (1-6) with the definitions (A-F).

- 1 ___ smoker 4 ___ top-bar hive
2 ___ honey 5 ___ beehive frame
3 ___ honeycomb 6 ___ cold smoke aerosol

- A a structure that houses a bee colony
B a structure with a bar that bees build their colony on
C a pressurized container that releases smoke
D a structure with six-sided cells
E a sweet substance that bees make
F a device that burns materials to produce smoke

5 Listen and read the webpage again. What do they suggest every beekeeping operation must have?

Listening

6 Listen to a conversation between an employee and customer. Mark the following statements as true (T) or false (F).

- 1 ___ The man wants to purchase a wooden beehive frame.
2 ___ The woman recommends liquid smoke.
3 ___ Cold smoke aerosols do not damage wooden frames.

7 Listen again and complete the conversation.

Employee: Can I help you find anything today?
Customer: Yes, I'm looking for liquid smoke.
Employee: That's right over here by the smokers. Can I ask what type of apiary you have?
Customer: I just got a wooden beehive frame. Why do you ask?
Employee: Well, 1 _____ can be a problem with wooden hives.
Customer: Really? 2 _____?
Employee: It leaves stains on wood. Also, you have to be really careful when you use it. The liquid can ruin your honey.
Customer: Oh, that's 3 _____. Is there something else that you'd 4 _____?
Employee: 5 _____ cold smoke aerosols.
Customer: Will those stain the wood in my hive?
Employee: No. But you still need to be careful and avoid spraying them into the 6 _____.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

I'm looking for ...

Can I ask what type of apiary you have?

The liquid can ruin your honey.

Student A: You work in a beekeeping supply store. Ask Student B about:

- help finding items
- type of apiary
- types of smokers

Student B: You are a beekeeper. Answer Student A's questions.

Writing

9 Use the conversation from Task 8 to fill out the customer's notes. Include information on types of smokers and using them safely.

Notes on smokers

Types: _____

Instructions for use: _____



silt

highly-organic

peat

sand

KCI Laboratories

Soil Analysis Report

Prepared for: Sam Jones / Prepared by: Kim Horton

We took soil samples from three proposed farm locations. See the chart below for details.

The samples indicate substantially different soils at each location. The table below summarizes the texture, composition, and classification of the samples. No **highly-organic** soils were found. Both sites 01 and 03 offer desirable soil. However, in both cases we recommend adding **peat**. That will make them more suitable for agriculture. The soil at Site 02 is not suitable for irrigated agriculture.

Sample	Grain texture	Composition			Unified Soil Classification System Symbol/ Group Name
		% sand	% silt	% clay	
Site 01	fine-grained	5	15	80	CL/ clay
Site 02	coarse-grained	75	21	4	SM/ silty sand
Site 03	medium-grained	2	68	32	MH/ elastic silt

Vocabulary

3 Read the sentence pair. Choose where the words best fit the blanks.

1 highly-organic / course-grained

A _____ soil is best suited for farming.

B Growing crops in _____ soil is difficult.

2 peat / clay

A _____ makes soil more fertile.

B _____ is much more dense than sand.

3 unified soil classification system / composition

A Each soil type has a different _____.

B Soil types are organized by the _____.

4 Match the words (1-6) with the definitions (A-F).

1 _ sand

4 _ classification

2 _ silt

5 _ fine-grained

3 _ grain

6 _ texture

A soil deposited by water

B consisting of tiny particles

C a small piece of material

D group something belongs to

E how something feels

F soil made of rock and minerals

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What types of soil are there?
- 2 How does soil type affect crop growth?

Reading

2 Read the soil analysis report. Then, mark the following statements as true (T) or false (F).

- 1 _ No site had the same grain texture.
- 2 _ Sites 01 and 03 had highly-organic soil.
- 3 _ Adding peat to Site 02 will make it suitable for irrigated farming.

- 5 🎧 Listen and read the soil report again. Which site would not be a good location for a farm?

Listening

- 6 🎧 Listen to a conversation between a scientist and a farmer. Choose the correct answers.

- Why does the farmer call the scientist?
 - to ask for advice on which field to plant
 - to discuss the soil analysis results
 - to point out an error in the report
 - to request a second analysis
- When would the field need to be irrigated?
 - when the soil became sandy
 - when wheat is planted there
 - when there is below average rainfall
 - when clay is present in the soil

- 7 🎧 Listen again and complete the conversation.

Scientist: Hello, KCI Laboratories, Kim Horton speaking.

Farmer: Hi, Kim. This is Sam Jones at Breyton Farming. I just looked over the results from the soil analysis you sent.

Scientist: Do you have any questions?

Farmer: Actually, yes, I do. Just so I'm clear, the sample from the north field had a lot of clay in it.

Scientist: That's correct.

Farmer: So if I planted wheat there, it would 1 _____ well.

Scientist: Yes. It has very 2 _____ clay. So when it rains, the soil will hold the water very well.

Farmer: If I 3 _____, then I wouldn't need to irrigate that field.

Scientist: That's correct. 4 _____ the rainfall is normal.

Farmer: Of course. There's 5 _____ . The east field sample showed it's very sandy. I just want to 6 _____ that I can irrigate there.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

Do you have any questions?

The sample from the north field has ...

I just want to make sure that I can ...

Student A: You are a farmer who received a soil analysis. Ask Student B about:

- clay in fields
- sand in fields
- irrigation

Student B: You are a scientist who analyzed the soil. Answer Student A's questions.

Writing

- 9 Use the conversation from Task 8 to fill out the farmer's notes.

Soil Composition

North field soil type: _____

North field water/irrigation requirements:

East field soil type: _____

East field water/irrigation requirements:

9

Salts and acidity



Get ready!

1 Before you read the passage, talk about these questions.

- 1 How does salt get into soil?
- 2 How can farmers reduce acid levels in soil?



Reading

2 Read the newspaper article. Then, choose the correct answers.

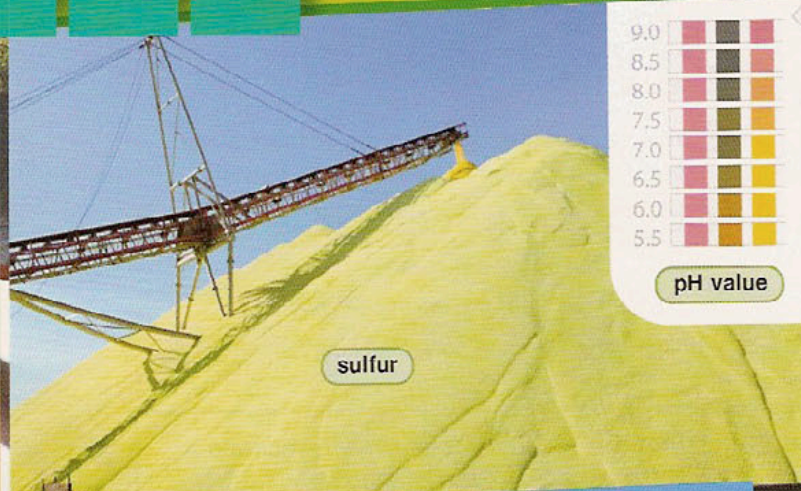
- 1 What changed the soil's primary salinity?
 - A saline deposits in the soil
 - B acids from rainwater
 - C minerals from well water
 - D toxins from fertilizer
- 2 How does the farmer improve his soil?
 - A He plants fewer crops.
 - B He adds lime to the soil.
 - C He irrigates in the summer.
 - D He increases the salinity.
- 3 When can you infer the crops will grow properly again?
 - A when farmers can stop irrigating
 - B when the pH value of the soil is lowered
 - C when sulfur content in the soil increases
 - D when farmers purify the well water

Vocabulary

3 Match the words (1-5) with the definitions (A-E).

- | | |
|----------------|------------------------|
| 1 ___ acidity | 4 ___ primary salinity |
| 2 ___ alkaline | 5 ___ lime |
| 3 ___ sodicity | |

- A the amount of sodium in the soil
- B the amount of acid in the soil
- C a substance added to improve soil
- D salt that is in soil from natural processes
- E having a pH value greater than 7.0



sulfur

THE MIDLAND HERALD MONDAY AUGUST, 14

Farmers Struggle against Salt and Acid

WAYNESBORO - Martin Harrison has been a farmer for half a century. Recently, his crops have grown poorly. The culprit: rising **salinity** and **acidity** along with decreasing **sodicity**.

Harrison's farm is located in Brown County, an area known for its rich farmland with little risk for salinity problems. Historically, the **primary salinity** of the soils there was low. That started to change two years ago when drought arrived. Farmers began irrigating their fields with well water. That water has high potassium, chloride, and **sulfur** content. At first there were no problems. However, mineral deposits built up. This resulted in the increased **secondary salinity** of the soil. It also made the soil acidic and **alkaline**.

Harrison started to notice problems last summer. His tomato plants died. The soil had become **toxic** to several other vegetables as well. He now increases the soil's **pH value** by adding **lime**. But that is just a temporary solution to the problems caused by irrigation. Until the drought ends, crop yields will suffer.

...



salinity

4 Write a word that is similar in meaning to the underlined part.

- Plants won't grow in soil with too much alkaline metal. _ _ _ i _ m
- Some substances are harmful to plants. t _ _ _ c
- Irrigation leads to an increase in the salt level changed by land use and management. _ _ c o n _ _ _ _ s _ l _ _ _ _
- Chemicals can alter soil's measure of acidity or alkalinity. _ H _ a _ _ _
- The soil has high metallic element levels. _ u l _ _ _
- What is the concentration of salt of the soil? s _ _ _ _ _ t _

5 Listen and read the newspaper article again. What is wrong with the soil on Harrison's farm?

Listening

6 Listen to a conversation between two farmers. Mark the following statements as true (T) or false (F).

- Both farmers have acidic soil.
- Adding lime raises soil's salinity.
- The man's crops grow well in acidic soil.

7 Listen again and complete the conversation.

Farmer 1: All this irrigated water is making my fields acidic. 1 _____ ?

Farmer 2: Yeah, I have the same problem. I've heard of a few fixes, though.

Farmer 1: Have 2 _____ ?

Farmer 2: Only one so far. I've 3 _____ my fertilizer.

Farmer 1: What are the results?

Farmer 2: Well, 4 _____ the pH to 7.5.

Farmer 1: That's good, right?

Farmer 2: It is and it isn't. It works for now. 5 _____ time I irrigate, that'll change again. Do you see 6 _____ ?

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

This irrigated water is making my fields acidic. I've heard of a few fixes. What are the results?

Student A: You are a farmer. Talk to Student B about:

- acidic soil
- treatment methods
- future plans

Student B: You are a farmer. Talk to Student A about soil acidity.

Writing

9 Use the conversation from Task 8 to fill out the farmer's plan to lower soil acidity.

Problem: _____

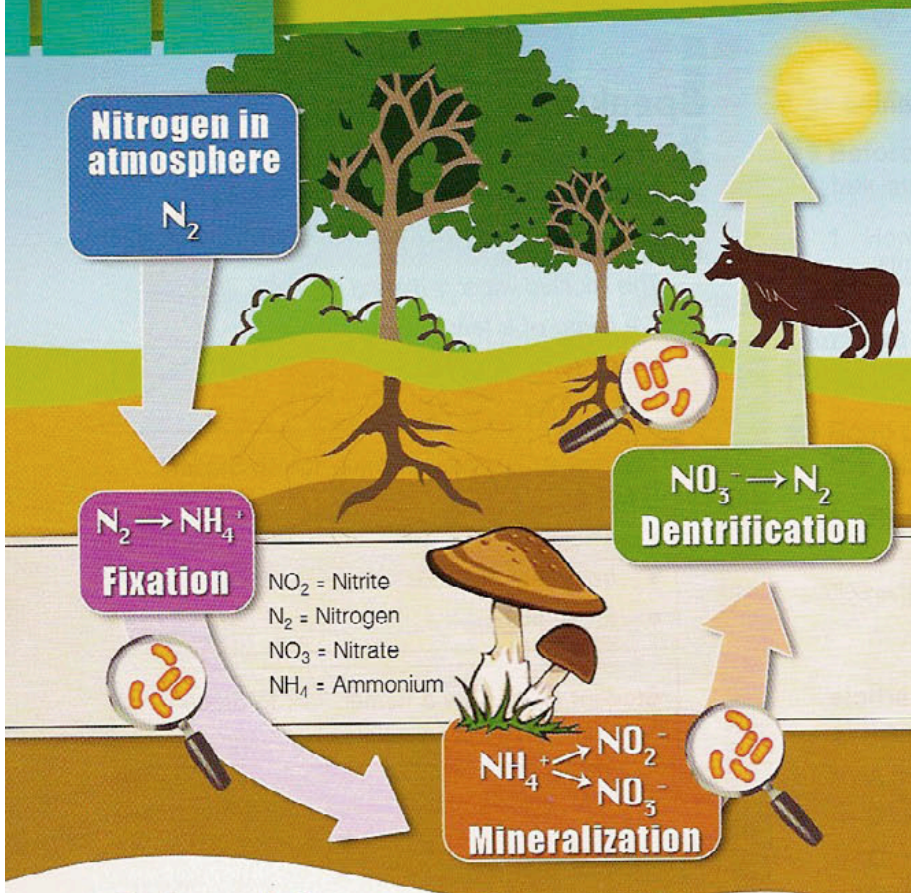
Possible Solution: _____

Pros: _____

Cons: _____

Plan for next year: _____

10 The nitrogen cycle



Nitrogen is a crucial nutrient for growing plants. Without the **nitrogen cycle**, which restores **nutrient-poor** soil, plants could not survive. During this cycle, nitrogen takes on many forms. It starts in the atmosphere as nitrogen gas. In this form, plants cannot absorb it. That changes after **fixation**, the next phase of the nitrogen cycle. During fixation, bacteria turn nitrogen into **ammonia**. In the next phase, mineralization, **decomposers** in the soil turn ammonia into **nitrites** and **nitrates**—forms of nitrogen that plants can use. Finally, during **dentrification**, bacteria reduce nitrates back into nitrogen gas.

Of course, the nitrogen cycle can also have negative effects. For example, it produces chemicals like **nitrous oxide**. When this substance leaks into bodies of water, **eutrophication** occurs. This build-up of algae can ruin a water supply. Unfortunately, commercial farming produces a great deal of such chemicals. A challenge facing modern farmers is to reduce their contribution to this harmful aspect of the nitrogen cycle.

Get ready!

1 Before you read the passage, talk about these questions.

- How is nitrogen added to soil?
- Why must farmers monitor nitrogen levels in soil?

Reading

2 Read the textbook passage. Then, mark the following statements as true (T) or false (F).

- Plants cannot survive without nitrogen.
- During fixation, decomposers turn ammonia into nitrogen.
- Nitrous oxide can cause algae build up in water supplies.

Vocabulary

3 Read the sentence pair. Choose where the words best fit the blanks.

1 ammonia / nitrous oxide

- A _____ is a component in many fertilizers.
 B _____ is a toxic product of the nitrogen cycle.

2 eutrophication / detrification

- A _____ restores nitrogen in the air.
 B _____ occurred in the pond due to fertilizer runoff.

4 Match the words (1-6) with the definitions (A-F).

- ___ fixation
- ___ decomposer
- ___ nitrite
- ___ nutrient-poor
- ___ nitrate
- ___ nitrogen cycle

- A not having the right amount of minerals to be healthy
 B substance that bacteria create from ammonia
 C the processes by which nitrogen is changed into chemical forms
 D the process of converting nitrogen into ammonia
 E substance that bacteria create from nitrites
 F organism that turns dead animals or plants into chemical nutrients

- 5 🎧 Listen and read the textbook passage again. At what stage can plants start to absorb nitrogen gas?

Listening

- 6 🎧 Listen to a conversation between two farmers. Choose the correct answers.

- 1 Why are the farmers concerned about using fertilizer?
- A It might set back the current harvest.
 - B It could affect the water supply.
 - C It can reduce the nitrogen in the soil.
 - D It may cause damage to the cover crop.
- 2 What will the farmers do with the south field?
- A irrigate it more often
 - B leave the field fallow next year
 - C finishing harvesting its legumes
 - D plant nitrogen restoring crops in it

- 7 🎧 Listen again and complete the conversation.

- Farmer 1: So, what should we do with the south field?
- Farmer 2: I'm not sure what you mean.
- Farmer 1: Well, this year's yield is pretty low. The soil might be nutrient poor.
- Farmer 2: What do you suggest?
- Farmer 1: We could plant legumes.
- Farmer 2: I'm not 1 _____.
- Farmer 1: Well, 2 _____ the soil is low on nitrogen. We could use legumes as this year's cover crop.
- Farmer 2: 3 _____ Just have the legumes restore the nitrogen.
- Farmer 1: Exactly. It's better than using too much fertilizer. I don't want our 4 _____ getting damaged.
- Farmer 2: Well, I think that's a good idea. Let's 5 _____ this year's harvest. We still have a few days left.
- Farmer 1: Sounds good. Then we can sit down and 6 _____ what legumes to plant.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

*What should we do with the south field?
We could use legumes as the cover crop.
It's better than using too much fertilizer.*

Student A: You are a farmer. Talk to Student B about:

- nitrogen in the fields
- fertilizer
- legumes

Student B: You are a farmer. Talk to Student A about nitrogen in the fields.

Writing

- 9 Use the conversation from Task 8 to fill out the farmer's schedule.

Harvest and Planting Schedule

South Field

- 1 _____

- 2 _____

- 3 _____



11 Soil conservation

Get ready!

1 Before you read the passage, talk about these questions.

- 1 In what ways can soil be damaged?
- 2 What parts of your country have the best soil?

A Guide to Soil Conservation

Without healthy soil, farmers can't produce healthy crops. But soil faces many threats, including **nutrient depletion** and **erosion**. Fortunately, several methods of **soil conservation** can turn unhealthy soil into a plant paradise.

One method, **crop rotation**, solves nutrient depletion. **Cover crops**, or **green manure**, are rotated with other crops. This process increases the amount of nitrogen in the soil and reverses **land degradation**.

In addition to addressing nutrient-depletion, farmers also combat erosion. Several practices can prevent erosion. Planting **windbreaks** stops topsoil loss from wind. **Perimeter runoff control** prevents erosion from water. For example, **grassways** slow water and direct it away from fields.

Contour-farming techniques, such as **keyline design**, also prevent water from eroding soil. In one method, farmers plow rows **perpendicular** to hills. The water slows as it reaches the rows, which results in less soil loss.

Reading

2 Read the magazine article. Then, choose the correct answers.

- 1 What is the main purpose of the article?
A to show the benefits of soil additives
B to describe soil conservation methods
C to recommend soil conservation products
D to explain the financial costs of soil damage
- 2 Which is NOT a suggestion made in the article?
A planting cover crops
B using keyline design
C applying manure fertilizer
D having perimeter runoff control
- 3 Which would be the best solution for nutrient depletion?
A crop rotation C windbreaks
B soil conservation D contour farming

Vocabulary

3 Match the words (1-8) with the definitions (A-H).

- 1 — nutrient depletion
 - 2 — contour farming
 - 3 — cover crops
 - 4 — green manure
 - 5 — soil conservation
 - 6 — grassways
 - 7 — keyline design
 - 8 — perimeter runoff control
- A a name for cover crops that add nitrogen
B process where nutrients are taken from soil
C grassy areas that slow water flow
D the practice of maintaining soil
E plants that add nutrients to soil and prevent it from washing away
F a method of plowing to prevent erosion
G the use of plants near a field's borders to prevent erosion
H design that maximizes water resources

erosion

windbreak

cover crops

perpendicular

4 Write a word that is similar in meaning to the underlined part.

- The rows are at right angles to the fence.
p _ _ p e _ d _ _ _ _ a _
- The farmer needs a way to stop wind or water removing the soil in his fields. _ _ o _ _ _ n
- Tree barriers shelter fields from the wind.
_ _ n _ _ _ _ a _ _
- Growing different crops at different times helps keep soil healthy.
c _ _ _ r _ _ _ t _ _ _
- The forest experienced negative effects on the land after the flood.
_ _ n _ _ e _ _ _ d _ _ _ _ n

5 Listen and read the magazine article again. What is the importance of perimeter grassways? What do they do?

Listening

6 Listen to a conversation between two farmers. Mark the following statements as true (T) or false (F).

- The farmers are concerned about nutrient depletion.
- The land the farm sits on is flat.
- The farmers will plant a grassway.

7 Listen again and complete the conversation.

Farmer 1: I'm really worried about the soil in the fields. It's 1 _____ soggy.

Farmer 2: Yeah, there's been so much rainfall the 2 _____.

Farmer 1: The soil is 3 _____. We have to do something.

Farmer 2: I agree. But what can we do?

Farmer 1: I think contour farming is a good option.

Farmer 2: I'm 4 _____ that. We'd have to re-design our fields.

Farmer 1: True, but look at our land! We have 5 _____.

Farmer 2: Well, you 6 _____ there. Contour-farming could be good for us in the next few years. But we have to do something sooner than that.

Farmer 1: How about starting with a grassway?

Farmer 1: I like that. We can buy some sod and install it next weekend.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

I'm worried about the soil in the fields.
We have to do something.
We'd have to re-design our fields.

Student A: You are a farmer. Talk to Student B about:

- soil condition
- future plans
- immediate plans

Student B: You are a farmer. Talk to Student A about soil.

Writing

9 Use the conversation from Task 8 and the magazine article to fill out the farmer's plan.

Plan for Field 7

Problem: _____

Solution: _____

Problem: _____

Solution: _____

Problem: _____

Solution: _____

Get ready!

1 Before you read the passage, talk about these questions.

- 1 How are fields in your country prepared for planting?
- 2 What planting methods are the most common in your country?

Reading

2 Read the section of *The Farmer's Guide*. Then, mark the following statements as true (T) or false (F).

- 1 Amendments add nutrients to soil.
- 2 Herbicides should be applied weeks after planting.
- 3 Broadcast seeding is effective with oats.

Vocabulary

3 Match the words (1-5) with the definitions (A-E).

- | | |
|--|--|
| 1 <input type="checkbox"/> seeds per pound | 4 <input type="checkbox"/> amendment |
| 2 <input type="checkbox"/> broadcast seeding | 5 <input type="checkbox"/> seeds per square foot |
| 3 <input type="checkbox"/> plant density | |

- A a method of scattering seeds
 B amount of seeds planted per square foot
 C the number of seeds in a pound of seeds
 D the number of plants in a certain area
 E a substance added to improve soil



The Farmer's Guide



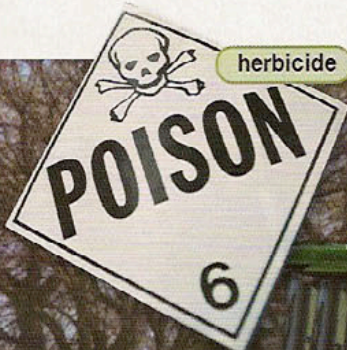
Chapter 1: Preparing, Seeding, and Planting

Although different crops demand different preparation, some practices apply to almost any crop. And what you do before planting is just as important as what you do after. Preparing the **topsoil** is always key. Test it in late summer to determine if **amendments** like lime, sulfur, or phosphorous are needed to adjust acidity. If the soil is nutrient-deficient, add fertilizer.

Likewise, most fields require treatment with an **herbicide**. Waiting two weeks to plant after using some herbicides is recommended.

Once the **soil temperature** is right, planting can begin. The **seeding rate** is determined by the ideal **seeds per pound** and **seeds per square foot**. Be sure to calculate the appropriate **plant density**. A miscalculation will result in low **emergence**.

The actual planting of seeds will vary by crop. **Broadcast seeding** may work for some seeds, while seed drills work better for small grains such as wheat or oats.



fertilizer

- 4 Fill in the blanks with the correct words and phrases from the word bank.

Word BANK

soil temperature topsoil seeding rate
herbicide emergence fertilizer

- The farmer used _____ to improve the soil.
- The weeds died after Mary used _____.
- It is still too cold to plant the seeds; the _____ is 25 degrees.
- During droughts, the _____ can be blown away by strong winds.
- The farmer was pleased to have 90 percent _____ of the newly planted crops.
- This field's _____ is 10 pounds per acre.

- 5 Listen and read the section of *The Farmer's Guide* again. Which month would be best to test the topsoil?

Listening

- 6 Listen to a conversation between two farmers. Check (✓) the items the farmers plan to implement to increase production.

- increased plant density
- fewer seeds per square foot
- fertilizer
- planting more fields

- 7 Listen again and complete the conversation.

Farmer 1: Well, our production has been down. We didn't produce 1 _____ this year as we did last year.

Farmer 2: That's true. You think it's because we planted 2 _____ close together?

Farmer 1: Yes, exactly. I know we were trying to grow more wheat per field. But it's 3 _____ effect.

Farmer 2: So what do you suggest?

Farmer 1: We'll 4 _____ our seeding rate and plant fewer seeds per square foot.

Farmer 2: I guess that would work. But we can do more to increase production.

Farmer 1: What were 5 _____?

Farmer 2: Well, just the usual. Adding 6 _____, things like that.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

*Our production has been down.
What do you suggest?
We can do more to increase production.*

Student A: You are a farmer. Talk to Student B about:

- crop production
- plant density
- improving soil

Student B: You are a farmer. Talk to Student A about your fields.

Writing

- 9 Use the conversation from Task 8 to fill out the farmer's email to the farm owner.

Dear Mr. Owens.

I want to change how we _____.

This year, _____.

I think this is due _____.

I recommend that we _____.

We can also _____.

Please let me know what you think of these changes.

Sincerely,

13 Climate and weather

Vegetables

SEEDS UNLIMITED

Poblano Pepper \$3.19/pack

Plant in: full sun / soil temperature: 68-90 degrees Fahrenheit

Description: Poblanos are flavorful peppers that are perfect for spicing sauces. They grow in warm areas with moderate **humidity**. Check your **hardiness zone** to make sure Poblanos grow in your region. Plant seeds about twelve weeks before **last frost**. A local **long-range forecast** will help you determine when to plant. Poblanos need some water, but just to keep the soil slightly damp. Do not over-water. Harvest after 14 to 16 weeks.

Famosa Cabbage \$3.79/pack

Plant in: partial shade / soil temperature: 59-64.4 degrees Fahrenheit

Description: The Famosa Cabbage is a crispy vegetable that grows in cool **climates**. Famosas need lots of water, so areas with high **precipitation** are ideal for growing. Use plenty of **mulch** to maintain healthy **soil moisture**. These cabbages need only partial sun. Plant six weeks before last frost. Harvest in late autumn for best results.

last frost

Get ready!

1 Before you read the passage, talk about these questions.

- 1 How does the climate in your country affect farming?
- 2 How can weather help and harm crops?

Reading

2 Read the seed catalog. Then, mark the following statements as true (T) or false (F).

- 1 Poblano peppers grow best in areas with high precipitation.
- 2 Both types of seeds require full sun.
- 3 The cabbage should be harvested in the fall.

Vocabulary

3 Fill in the blanks with the correct words and phrases from the word bank.

Word BANK

precipitation last frost
temperature hardiness zones

- 1 If the _____ falls too low, the plants will die.
- 2 Don't plant any seeds until after the _____.
- 3 If there is enough _____, you won't have to irrigate.
- 4 Different plants may have different _____.

temperature

soil moisture

4 Match the words (1-5) with the definitions (A-E).

- 1 ___ climate
- 2 ___ humidity
- 3 ___ mulch
- 4 ___ long-range forecast
- 5 ___ soil moisture

- A weather conditions in a particular area
- B the amount of water in the soil
- C the amount of water in the air
- D material that is spread on the ground to protect plants
- E a prediction of future weather conditions

5 Listen and read the seed catalog again. What kind of location would be perfect for growing Famosa cabbage?

Listening

6 Listen to a conversation between a seed store employee and a customer. Mark the following statements as true (T) or false (F).

- 1 ___ The Scottsdale seeds grow best in warm climates.
- 2 ___ The man suggests a different seed type.
- 3 ___ The last frost of the season has passed.

7 Listen again and complete the conversation.

Customer: Excuse me. Can you help me
1 _____ some seeds?

Employee: 2 _____ . What type of crop do you want to grow?

Customer: I'm going to plant some lettuce. I found these Scottsdale lettuce seeds.

Employee: Oh, I wouldn't plant the Scottsdale. It needs a 3 _____ climate. I 4 _____ the Waldmann's lettuce.

Customer: 5 _____ ? Why is that?

Employee: The Waldmann's is very hearty. It can 6 _____ weather around here.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

Can you help me pick out some seeds?
I'm going to plant some ...
I recommend the ...

Student A: You work in a seed supply store. Talk to Student B about:

- type of crop
- seed types
- weather and climate

Student B: You want help choosing seeds. Answer Student A's questions.

Writing

9 Use the conversation from Task 8 to fill out the customer feedback form.

Simon's Seed
CUSTOMER FEEDBACK FORM

Customer Name: _____

Items Purchased: _____

Was our employee helpful? Y / N

Please describe your experience: _____

14 Pricing



Dear Mr. Kowalski,

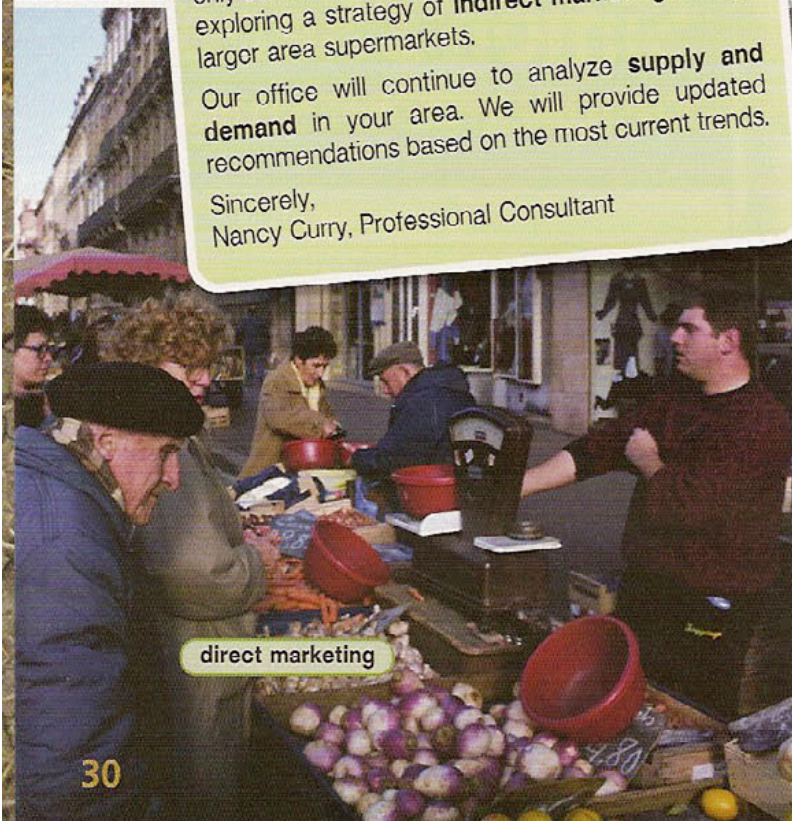
Our office analyzed your business practices as you requested. We have a few suggestions to improve your **pricing strategy**.

We believe that it is time to consider **pricing for competition**. There are several new **produce** sellers in your area. Some are offering lower prices for the same vegetables that you sell. For example, you sell spinach for \$5.49 per pound. Most other sellers are offering spinach for less than \$5.00 per pound. They attract customers who want large quantities by offering **pricing for value**. We suggest moderate price decreases that maintain **pricing for profit**. As long as your prices remain higher than your **cost of production**, your business will make money.

We also think it is time for you to expand beyond **direct marketing**. Profits will remain limited if you only sell at the local farmer's market. We recommend exploring a strategy of **indirect marketing** through larger area supermarkets.

Our office will continue to analyze **supply and demand** in your area. We will provide updated recommendations based on the most current trends.

Sincerely,
Nancy Curry, Professional Consultant



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What factors influence crop prices?
- 2 What factors are included in a farmer's cost of production?

Reading

2 Read the business letter. Then, choose the correct answers.

- 1 What is the purpose of the letter?
A to market a new product
B to offer new services to a client
C to bill a customer for services
D to explain the results of an analysis
- 2 How do the client's prices compare to others?
A They are higher than other's prices.
B They are the same as other's prices.
C They are lower than other's prices.
D They change more often than other's prices
- 3 What suggestion does Ms. Curry make?
A lowering production costs
B studying local supply and demand
C marketing to grocery stores in the area
D increasing prices by five percent

Vocabulary

3 Read the sentence pair. Choose where the words best fit the blanks.

- 1 **direct marketing / indirect marketing**
A In _____, customers buy from farmers.
B _____ involves farmers selling crops to stores where customers shop.
- 2 **supply and demand / cost of production**
A Prices must make up for the _____.
B Prices change according to _____.
- 3 **pricing strategy / produce**
A Sell this _____ before it spoils.
B Change your _____ to make a bigger profit.

4 Match the words (1-4) with the definitions (A-D).

- 1 ___ pricing
 - 2 ___ pricing for profit
 - 3 ___ pricing for competition
 - 4 ___ pricing for value
- A setting a price that is less than other sellers
 - B setting a lower price for large quantities
 - C the process of establishing costs for items
 - D setting a price that exceeds the cost of production

5 Listen and read the business letters again. What does the consultant suggest would attract more clients?

Listening

6 Listen to a conversation between a consultant and a farmer. Mark the following statements as true (T) or false (F).

- 1 ___ The man did not know his competition's prices.
- 2 ___ The woman suggests a new pricing strategy.
- 3 ___ The client will charge the same price for large and small amounts.

7 Listen again and complete the conversation.

Consultant: Mr. Kowalski, did you 1 _____ to read our recommended business improvements?

Farmer: I did, Miss Curry. Can you give me some more information about 2 _____?

Consultant: Of course. Your spinach goes for \$5.49 per pound. All 3 _____ in your area sell spinach for at least \$0.50 less per pound.

Farmer: Wow. I didn't 3 _____ my products are. What changes do you suggest?

Consultant: We 5 _____ some estimates. You can lower your spinach price to \$4.89 per pound and still cover your 6 _____.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

Can you give me more information about ...
I didn't realize how expensive ...
What changes do you suggest?

Student A: You are a business consultant. Talk to Student B about:

- client's prices
- competition's prices
- new pricing strategy

Student B: You are a farmer. Talk to Student A about the price of your crops.

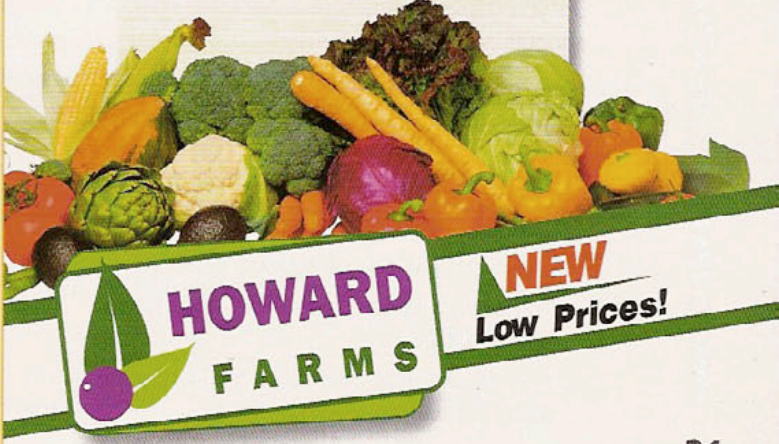
Writing

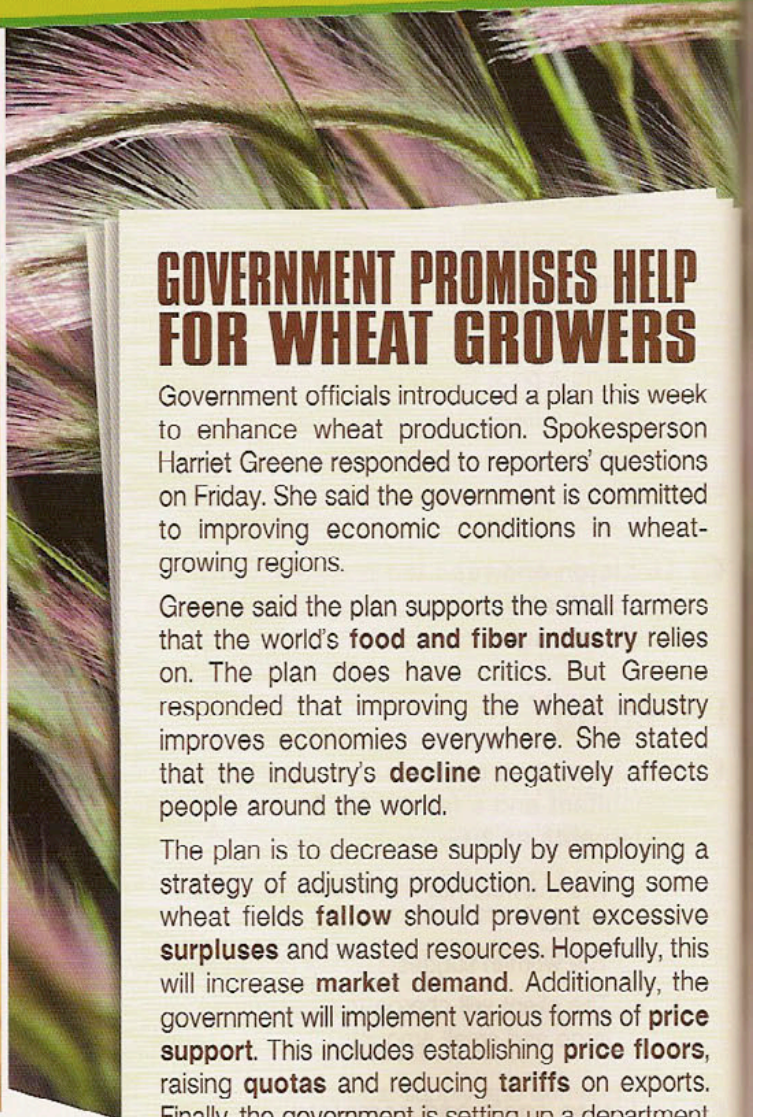
9 Use the conversation from Task 8 to describe the new pricing strategy.

Beginning this week, orders of _____

Orders of _____

will still be _____





GOVERNMENT PROMISES HELP FOR WHEAT GROWERS

Government officials introduced a plan this week to enhance wheat production. Spokesperson Harriet Greene responded to reporters' questions on Friday. She said the government is committed to improving economic conditions in wheat-growing regions.

Greene said the plan supports the small farmers that the world's **food and fiber industry** relies on. The plan does have critics. But Greene responded that improving the wheat industry improves economies everywhere. She stated that the industry's **decline** negatively affects people around the world.

The plan is to decrease supply by employing a strategy of adjusting production. Leaving some wheat fields **fallow** should prevent excessive **surpluses** and wasted resources. Hopefully, this will increase **market demand**. Additionally, the government will implement various forms of **price support**. This includes establishing **price floors**, raising **quotas** and reducing **tariffs** on exports. Finally, the government is setting up a department to address **foreign trade enhancement**. The department will identify ways to increase wheat trade worldwide.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 Does your government take an active role in agriculture?
- 2 Do you think governments should control agriculture? Why or why not?

Reading

2 Read the newspaper article. Then, mark the following statements as true (T) or false (F).

- 1 Some people do not support the plan
- 2 The plan calls for planting all available wheat fields.
- 3 The government intends to lower taxes on exported wheat.

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|--|--|
| 1 <input type="checkbox"/> decline | 4 <input type="checkbox"/> market demand |
| 2 <input type="checkbox"/> quota | 5 <input type="checkbox"/> adjusting production |
| 3 <input type="checkbox"/> price floor | 6 <input type="checkbox"/> foreign trade enhancement |

- A the desirability of a product
- B the process of becoming less or worse
- C a limit on the amount of something
- D a legal limit on how low a price can be
- E the act of improving international trade
- F changing the amount of a product that is made

4 Write a word that is similar in meaning to the underlined part.

- Most agriculture focuses on the production of food and other products.
f _ _ _ _ n _ _ b _ _ i n _ _ _ _ _
- Taxes on imports and exports can help trade. t _ r _ _ _ _
- Leave that field unplanted this season. _ _ l l _ _
- The extra supply of wheat lowered prices. _ u _ p _ _ _
- Methods of maintaining high prices ensures that crop prices don't collapse. _ _ _ c e _ _ p p _ _ _

5 Listen and read the newspaper article again. How does the government plan to decrease supply?

Listening

6 Listen to a conversation between farmer and assistant. Choose the correct answers.

- Why isn't the farmer planting wheat?
 - The fields need to lie fallow for a season.
 - The price for wheat seeds has increased.
 - He is participating in a government program.
 - He is worried he won't be able to sell it.
- Why are the prices for wheat low?
 - The wheat crop was not good.
 - There is a surplus of wheat.
 - The market price for wheat is high.
 - The production of wheat has decreased.

7 Listen again and complete the conversation.

Assistant: But won't we lose money if we 1 _____ enough?

Farmer: Actually, the government is paying us to 2 _____.

Assistant: I had 3 _____. Why are they doing that?

Farmer: They want to decrease the supply. See, right now there's a 4 _____. So prices are low. But if everyone produces less wheat, the supply will fall. Do you see what I mean?

Assistant: I think so. And if the supply falls, the 5 _____ too. Right?

Farmer: Exactly. 6 _____, we'll just plant some cover crops in field 4-B.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

*But won't we lose money.
Why are they doing that?
If everyone produces less wheat,
the supply will fall.*

Student A: You are a farming assistant. Ask Student B about:

- not planting wheat
- government intervention
- supply and prices

Student B: You are a farmer. Answer Student A's questions.

Writing

9 Use the conversation from Task 8 to fill out the memo to farm staff. Explain why wheat will not be planted. Include information about surpluses and prices.

Franklin Farms

Memo

Staff: This year _____

Jack Franklin
Owner, Franklin Farms

Glossary

- accelerated lambing** [N-UNCOUNT-U5] **Accelerated lambing** is the act of breeding ewes more than once per year.
- acidity** [N-UNCOUNT-U9] **Acidity** is the concentration of acid in soil.
- adjusting production** [N-UNCOUNT-U15] **Adjusting production** is the process of limiting the production of a product to only what is needed for immediate sales.
- alkaline** [ADJ-U9] If a soil is **alkaline**, it contains an alkali and has a pH value greater than 7.0.
- amendment** [N-COUNT-U12] An **amendment** is a substance added to soil to improve it.
- ammonia** [N-UNCOUNT-U10] **Ammonia** is a chemical made from Nitrogen and Hydrogen, created during fixation.
- antibiotics** [N-COUNT-U1] **Antibiotics** are drugs that are used to kill harmful bacteria.
- apiary** [N-COUNT-U7] An **apiary** is a place where bees are kept.
- beef** [N-UNCOUNT-U1] **Beef** is the name for the meat derived from cattle.
- beehive frame** [N-COUNT-U7] A **beehive frame** is a structure that is constructed to house a bee colony.
- beesuit** [N-COUNT-U7] A **beesuit** is a protective garment that is worn by beekeepers.
- bridling** [N-UNCOUNT-U6] **Bridling** is the act of training a horse to accept a bit in its mouth.
- broadcast seeding** [N-UNCOUNT-U12] **Broadcast seeding** is a way of scattering seeds evenly over a large area of land by hand or mechanically, often followed by raking to cover the seeds.
- broiler** [N-COUNT-U3] A **broiler** is a medium-sized chicken sold in the US that is larger than a fryer but smaller than a roaster.
- broodmare** [N-COUNT-U6] A **broodmare** is a female horse that is used for breeding.
- calf** [N-COUNT-U4] A **calf** is a baby cow.
- cattle** [N-COUNT-U1] **Cattle** are the cows and bulls raised on a farm or ranch for beef or milk.
- chick** [N-COUNT-U3] A **chick** is a baby chicken.
- classification** [N-UNCOUNT-U8] **Classification** is the process of sorting things into different groups.
- clay** [N-UNCOUNT-U8] **Clay** is a type of sticky soil used to make pots, bricks, or tiles.
- climate** [N-COUNT-U13] A **climate** is set of weather conditions that is usual in a particular area.
- coarse-grained** [ADJ-U8] If soil is **coarse-grained**, it consists of relatively large particles.
- cold smoke aerosol** [N-COUNT-U7] A **cold smoke aerosol** is a pressurized container filled with a smoky substance that pacifies bees.
- colony** [N-COUNT-U7] A **colony** is an area where a group of bees live.
- composition** [N-UNCOUNT-U8] **Composition** is the parts that make something what it is.
- confinement lamb production** [N-UNCOUNT-U5] **Confinement lamb production** is a method of raising sheep in which the sheep are kept indoors.
- contour farming** [N-UNCOUNT-U11] **Contour farming** is when farmers plough rows perpendicular to the slope of a hill so that water does not as easily erode soil.
- cost of production** [N-UNCOUNT-U14] **Cost of production** is the sum of all costs required to produce something, including labor, land and materials.
- cover crops** [N-COUNT-U11] **Cover crops** are plants that farmers plant to increase the nutrients in the soil and to prevent soil from washing away.

crop rotation [N-UNCOUNT-U11] **Crop rotation** is the process by which farmers grow different crops at different times to replenish the soil.

dairy [N-UNCOUNT-U4] **Dairy** is a classification of food that includes all items made from milk.

decline [N-UNCOUNT-U15] **Decline** is the process of becoming less or worse.

decomposer [N-COUNT-U10] A **decomposer** is an organism or process that turns dead organic matter into chemical nutrients.

denitrification [N-UNCOUNT-U10] **Denitrification** is the process by which nitrogen is removed or lost from nitrogen compounds like nitrates and nitrites.

direct marketing [N-UNCOUNT-U14] **Direct marketing** is a method of sales in which the producer sells products directly to consumers.

distribute [V-T-U5] To **distribute** something is to sell it.

dynamic space [N-COUNT-U2] A **dynamic space** is the amount of space required to contain a sow's body in an enclosure and allow her to move.

emergence [N-UNCOUNT-U12] **Emergence** is the percentage of seeds that sprout into seedlings.

erosion [N-UNCOUNT-U11] **Erosion** occurs when wind or water removes the soil from a particular area and leaves it somewhere else.

eutrophication [N-UNCOUNT-U10] **Eutrophication** is the process by which substances like nitrates permeate fresh bodies of water.

ewe [N-COUNT-U5] A **ewe** is a female sheep.

fallow [ADJ-U15] If a field is **fallow**, it does not have crops planted in it.

farrow-to-finish farm [N-COUNT-U2] A **farrow-to-finish farm** is a farm that breeds and raises pigs from birth until they reach market weight.

farrow-to-nursery farm [N-COUNT-U2] A **farrow-to-nursery farm** is a farm that breeds and raises pigs that are then transferred to finishing farms to reach market weight.

feed conversion efficiency [N-NONCOUNT-U1] **Feed conversion efficiency** is a measure of how efficiently an animal converts feed into body mass.

feed ration [N-COUNT/NONCOUNT-U1] A **feed ration** is a selected amount of food that is enough for an animal's daily needs.

feeder lamb [N-COUNT-U5] A **feeder lamb** is a lamb that is sold for finishing.

feedlot [N-COUNT-U1] A **feedlot** is a large enclosed area for feeding a large number of cattle before processing.

fertilizer [N-UNCOUNT-U12] Any substance added to soil that improves its fertility is called a **fertilizer**.

fine-grained [ADJ-U8] If a soil is **fine-grained**, it consists of relatively tiny particles.

finishing [N-UNCOUNT-U5] **Finishing** is the act of feeding livestock and preparing it for slaughtering.

fixation [N-UNCOUNT-U10] During **fixation**, nitrogen in the air is converted into ammonia.

flock [N-COUNT-U5] A **flock** is a large group of sheep.

foal [N-COUNT-U6] A **foal** is a horse that is younger than one year.

food and fiber industry [N-COUNT-U15] The **food and fiber industry** is a network of farmers, distributors, retailers and other organizations that contribute to the production of food and other products.

Glossary

- foreign trade enhancement** [N-COUNT-U15] **Foreign trade enhancement** is the practice of improving systems and technologies for trade with other countries.
- free-range** [N-UNCOUNT-U3] If a chicken is **free-range**, it is able to roam around outside.
- grade** [N-COUNT-U1] The **grade** of beef is a measure of its quality.
- grain** [N-COUNT-U8] A **grain** is a very small, hard piece of material.
- grass-fed** [ADJ-U1] If cattle are **grass-fed**, they primarily eat grass foraged from a pasture or fields.
- grassway** [N-COUNT-U11] A **grassway** is one form of perimeter runoff control that appears between rows of crops.
- green manure** [N-UNCOUNT-U11] **Green manure** is a name for cover crops that farmers plant when they want to add Nitrogen to the soil.
- growth hormone** [N-COUNT-U1] A **growth hormone** is a chemical that increases cattle's rate of growth or milk production.
- halter breaking** [N-UNCOUNT-U6] **Halter breaking** is the act of training a horse to be led by a halter that is placed on its head.
- hardiness zone** [N-COUNT-U13] A **hardiness zone** is a defined geographical area with a climate that supports a particular set of plant life.
- hatchery** [N-COUNT-U3] A **hatchery** is a place that provides artificial conditions for hatching eggs.
- heifer** [N-COUNT-U4] A **heifer** is a young cow that has not yet given birth to a calf.
- hen** [N-COUNT-U3] A **hen** is an adult female chicken.
- herbicide** [N-UNCOUNT-U12] **Herbicides** are substances used to kill plants or slow down their growth.
- herd** [N-COUNT-U1] A **herd** is a group of cattle.
- highly-organic** [ADJ-U8] If a soil is **highly-organic**, it largely consists of organic material as opposed to non-organic mineral material.
- hog** [N-COUNT-U2] A **hog** is a pig that has grown large enough to be eaten.
- Holstein** [N-COUNT-U4] A **Holstein** is a breed of cattle that dairy farmers use.
- homogenize** [V-T-U4] To **homogenize** is to mix milk so that the cream is completely blended into it.
- honey** [N-UNCOUNT-U7] **Honey** is a sweet substance that is made by bees.
- honeycomb** [N-COUNT-U7] A **honeycomb** is a structure of six-sided cells that is constructed by bees within their hives.
- humidity** [N-UNCOUNT-U13] **Humidity** is the amount or measurement of moisture in the air.
- indirect marketing** [N-UNCOUNT-U14] **Indirect marketing** is a method of sales in which the producer sells products to a retailer or other party who then sells to consumers.
- intensive farming** [N-UNCOUNT-U3] **Intensive farming** is a method of raising chickens in a climate-controlled enclosed area.
- keyline design** [N-COUNT-U11] **Keyline design** is used to maximize the water resources for one piece of land.
- lambing period** [N-COUNT-U5] A **lambing period** is the time during which ewes produce lambs.
- land degradation** [N-UNCOUNT-U11] **Land degradation** occurs when human interaction with the land causes negative effects, like floods and fires.
- last frost** [N-UNCOUNT-U13] **Last frost** is the last time during the year that the temperature gets low enough to kill plants in a particular region. It usually indicates the beginning of the growing season.

layer (as in bird raised to lay eggs) [N-COUNT-U3] A **layer** is a hen that is used to produce eggs.

lime [N-UNCOUNT-U9] **Lime** is a white, alkaline substance used in farming that is made by crushing shells or limestone.

liquid smoke [N-UNCOUNT-U7] **Liquid smoke** is a substance made from mixing smoke with water. It is used to pacify bees.

litter [N-COUNT-U2] A **litter** is a group of baby pigs born together.

litter [N-UNCOUNT-U3] **Litter** is the manure and wood shaving waste produced by a chicken.

long-range forecast [N-UNCOUNT-U13] A **long-range forecast** is a prediction of weather conditions more than ten days in advance.

mare [N-COUNT-U6] A **mare** is a female horse.

market [N-COUNT-U14] A **market** is a place or area where products are advertised and sold.

market demand [N-UNCOUNT-U15] **Market demand** is the total demand for a particular product in a particular area or market.

market slaughter lamb [N-COUNT-U5] A **market slaughter** lamb is a lamb that is sold to be slaughtered.

market weight [N-UNCOUNT-U1] **Market weight** is how much cattle should weigh before they are processed into beef.

milk pipeline [N-COUNT-U4] A **milk pipeline** is system at a dairy that transfers milk from a cow into cooling and storage containers.

milking herd [N-COUNT-U4] A **milking herd** is a group of cows that produce milk.

milking parlor [N-COUNT-U4] A **milking parlor** is a special area in a dairy where cows are milked.

mineralization [N-UNCOUNT-U10] **Mineralization** is the process where nitrogen from organic matter is converted into ammonium.

mulch [N-UNCOUNT-U13] **Mulch** is a material that is spread over the ground to protect plants and stop unwanted plants from growing.

nitrites [N-COUNT-U10] **Nitrites** are chemical compounds that bacteria create from nitrites.

nitrites [N-COUNT-U10] **Nitrites** are chemical compounds that bacteria create from ammonium.

nitrogen cycle [N-COUNT-U10] The **Nitrogen cycle** is the set of processes by which nitrogen is changed into chemical forms and travels through various mediums, including soil, water, and air.

nitrous oxide [N-UNCOUNT-U10] **Nitrous oxide** is a product of denitrification, and its levels have risen significantly with the increased use of fertilizers.

nutrient depletion [N-UNCOUNT-U11] **Nutrient depletion** is the process where nutrients are taken out of the soil by plants or animals.

nutrient-poor [ADJ-U10] If soil is **nutrient-poor**, it does not have the right amount of minerals and other nutrients to produce healthy crops.

pasteurize [V-T-U4] To **pasteurize** is to use a special process of heating milk to kill bacteria.

peat [N-UNCOUNT-U8] **Peat** is a material made from decaying plants that can be added to soil to help plants grow.

perimeter runoff control [N-UNCOUNT-U11] **Perimeter** runoff control is the use of things like plants to prevent water from eroding the soil.

perpendicular [ADJ-U11] If a line is **perpendicular**, it forms a right angle to a line or plane.

pH value [N-COUNT-U9] The **pH value** is a measure between 0 and 14 that indicates the acidity (pH < 7.0) or alkalinity (pH > 7.0) of a substance.

Glossary

- plant density** [N-COUNT-U12] **Plant density** is the number of plants in a certain area.
- poultry** [N-COUNT/UNCOUNT-U3] **Poultry** are birds raised on farm for eggs and/or meat.
- precipitation** [N-UNCOUNT-U13] **Precipitation** is rain, snow and other forms of water that fall from the sky.
- preventative disease control** [N PHRASE-U6] **Preventative disease control** is a regimen of activities that are performed to avoid disease.
- price floor** [N-COUNT-U15] A **price floor** is a legal limit on how low the price of a product can be.
- price support** [N-UNCOUNT-U15] **Price support** is a method of maintaining a high price for a product.
- pricing** [N-UNCOUNT-U14] **Pricing** is the process of establishing a cost for something.
- pricing for competition** [N-UNCOUNT-U14] **Pricing for competition** is the process of establishing a product's price based on prices that other sellers are using.
- pricing for profit** [N-UNCOUNT-U14] **Pricing for profit** is the process of establishing a product's price that will cover and exceed the cost of production.
- pricing for value** [N-UNCOUNT-U14] **Pricing for value** is the process of establishing a product's price that offers lower prices for larger quantities.
- pricing strategy** [N-COUNT-U14] A **pricing strategy** is the method a seller chooses for establishing a product's price.
- primary breeder** [N-COUNT-U3] A **primary breeder** is a person who breeds chickens used by others for egg production.
- primary salinity** [N-UNCOUNT-U9] **Primary salinity** is when salts get into the soil by natural processes, such as groundwater movement.
- processing facility** [N-COUNT-U1] A **processing facility** is a place where cattle are killed and butchered.
- produce** [N-UNCOUNT-U14] **Produce** is fresh, raw food like fruits and vegetables.
- pullet** [N-COUNT-U3] A **pullet** is a young hen under one year of age.
- quota** [N-COUNT-U15] A **quota** is a limit on the amount or number of a product that can be imported or exported.
- rBST** [N-UNCOUNT-U4] **Recombinant bovine somatotropin (rBST)** is an artificial growth hormone given to cows to increase milk production.
- roaster** [N-COUNT-U3] A **roaster** is the largest size of chicken sold in the US.
- rooster** [N-COUNT-U3] A **rooster** is an adult male chicken.
- sacking out** [N-UNCOUNT-U6] **Sacking out** is the act of training a horse to not fear objects that humans place on it, particularly blankets or sacks.
- saddling** [N-UNCOUNT-U6] **Saddling** is the act of training a horse to accept having a saddle placed on its back.
- salinity** [N-UNCOUNT-U9] **Salinity** is the concentration of salt in soil.
- sand** [N-UNCOUNT-U8] **Sand** is a type of soil made of very small pieces of rocks or minerals that is often found on the beach or in the desert.
- seasonal market** [N-COUNT-U5] A **seasonal market** is a periodic increase in demand for livestock.
- secondary salinity** [N-UNCOUNT-U9] **Secondary salinity** is when salts get into the soil from human activities such as from irrigation.
- seeding rate** [N-COUNT-U12] **Seeding rate** is the amount of seeds planted per hectare.
- seeds per pound** [N-COUNT-U12] **Seeds per pound** is a measure of the number individual seeds in a pound of seeds.

seeds per square foot [N-COUNT-U12] **Seeds per square foot** is the amount of seeds planted in a square foot of space.

silt [N-UNCOUNT-U8] **Silt** is made when soil mixes with a body of water and then is deposited.

skep [N-COUNT-U7] A **skep** is a traditional beehive made from grass or straw.

smoker [N-COUNT-U7] A **smoker** is a device that produces smoke for the purpose of pacifying bees.

social space [N-UNCOUNT-U2] **Social space** is the amount of space required to allow a sow in an enclosure to socially interact with other sows.

sodicity [N-UNCOUNT-U9] **Sodicity** is the concentration of sodium in soil.

sodium [N-UNCOUNT-U9] **Sodium** is a chemical element with the symbol Na that is an ingredient in table salt.

soil conservation [N-UNCOUNT-U11] **Soil Conservation** is the act of maintaining soil so that it does not erode.

soil moisture [N-UNCOUNT-U13] **Soil moisture** is the amount of water contained in a particular region's soil.

soil temperature [N-UNCOUNT-U12] The **temperature** of the **soil** is called soil temperature.

sow [N-COUNT-U2] A **sow** is a female pig.

sow farm [N-COUNT-U2] A **sow farm** is a farm that raises female pigs for the purpose of producing baby pigs or piglets.

stall [N-COUNT-U6] A **stall** is a small partition inside a barn for an animal to live in.

stallion [N-COUNT-U6] A **stallion** is a male horse.

static space [N-UNCOUNT-U2] **Static space** is the amount of space required to contain a sow's body in an enclosure.

sulfur [N-UNCOUNT-U9] **Sulfur** is a chemical element with the symbol S that is typically yellow in color and has a powerful smell.

supply and demand [N-UNCOUNT-U14] **Supply and demand** is the relationship between the amount of a product that can be produced and the amount that consumers can or will buy.

surplus [N-COUNT-U15] A **surplus** is an amount or quantity of a product that exceeds the demand for that product.

swine [N-COUNT-U2] A **swine** is a type of animal including pigs and related animals.

tariff [N-COUNT-U15] A **tariff** is a tax on products that are being imported to or exported from a country.

temperature [N-COUNT-U13] **Temperature** is the measurement of something's heat.

texture [N-COUNT-U8] **Texture** is how something feels when touched.

top-bar hive [N-COUNT-U7] A **top-bar hive** is a beehive that has a suspended bar from which bees hang their honeycomb.

topsoil [N-UNCOUNT-U12] **Topsoil** is the top most layer of soil in which plants anchor most of their roots and from which they absorb most of their nutrients.

toxic [ADJ-U9] If something is **toxic**, it is harmful to life.

udder [N-COUNT-U1] An **udder** is the part of a cow that hangs from her belly and produces milk.

Unified Soil Classification System (USCS) [N-UNCOUNT-U8] The **Unified Soil Classification System** is a tool for grouping soils into types based on their texture and composition.

vaccination schedule [N-COUNT-U6] A **vaccination schedule** is a planned administration of disease-preventing injections.

veil [N-COUNT-U7] A **veil** is a protective covering for the head and face that is worn by beekeepers.

windbreaks [N-COUNT-U11] **Windbreaks** are tree barriers planted in a way that prevent the soil from eroding.