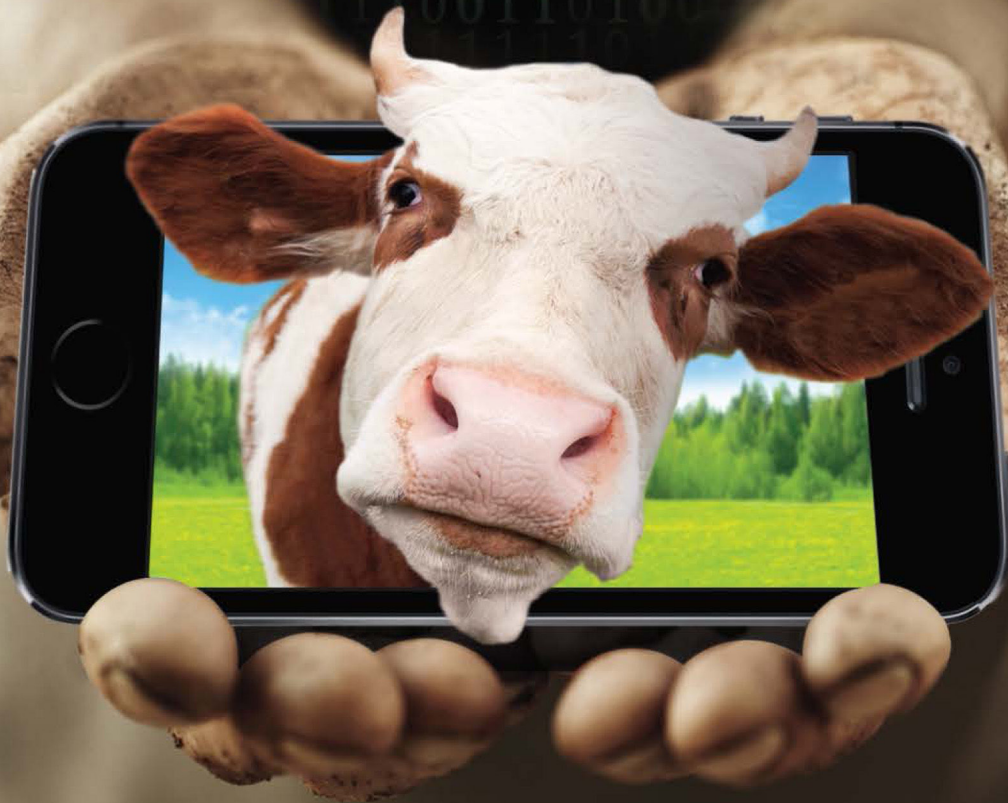


THEY'VE GOT TECH: *Next-Gen* *Farmers*



(888) 242-0563
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Video Page



They've Got Tech: Next-Gen Farmers

Teacher's Guide

This Teacher's Guide includes the following:

- Suggested Lesson Plan
- Preview Questions
- Key Terms
- Viewing Guide
- Discussion Questions
- Activity: Who Chooses
- Quiz
- Enrichment and Integration Activities
- Answer Key

Suggested Lesson Plan

These materials may be used in a variety of ways. For maximum benefit, we suggest the following lesson plan:

- As a class, discuss the Preview Questions and Key Terms.
- Distribute copies of the Viewing Guide for students to use as a note-taking tool during the video.
- Play the video, pausing if needed to facilitate understanding and note-taking.
- Review and discuss answers to the Viewing Guide using Answer Key as a guide.
- Use Discussion Questions to spark class discussion, or assign these questions as homework.
- As a class or in small groups, complete the Who Chooses Activity.
- Replay the video as preparation for the Quiz.
- Administer and grade the Quiz using Answer Key as a guide.
- Optional: Assign one or more Enrichment Activities as homework.

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Preview Questions

(These are meant to be read aloud by the teacher.)

1. Locate New Zealand on a map.
2. What do you know about New Zealand? What do you think it's like to live there?
3. What are farm subsidies?
4. What is technology?
5. What does technology have to do with farming?
6. Can you envision yourself choosing farming as a career? Why/why not?

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Key Terms and Definitions

Autonomy – independence; freedom

Complied – met specified standards; acted according to an order or set of rules

Density – how crowded or compact something is; population per unit of area

Ethical – morally right

Intensive – with higher levels of inputs and outputs per given agricultural area

Intuitive – instinctive; based on knowledge gained without reasoning or evidence

Pristine – unspoiled; in its original condition

Productive – generating crops, goods or services in abundance

Subsidy – a benefit given by the government to groups or individuals, usually in the form of a cash payment or a tax reduction

Sustainable – able to be continued over a long period without depleting natural resources

Viable – capable of working successfully; feasible

Name: _____

Date: _____

They've Got Tech: Next-Gen Farmers **Viewing Guide**

1. Thirty years ago a government program of farming _____ had grown out of control.
2. Today _____ is ... a world leader in productive, sustainable, and ethical farm practices.
3. Young people are choosing _____ as a viable, fun and high-tech career.
4. _____...now allows farmers to sell directly to their customers.
5. When concentrated in pastures, cow urine harms grasses and _____ ground water.
6. There weren't any mobile milking machines on the market, so Glen _____ one.
7. Once Glen's system was approved, he could sell to his _____ customers who appreciate his all-natural and local product.
8. Matt and Cushla employ new _____ to monitor almost every aspect of the farm.
9. Part of their goal is to make a decent _____ without having to increase the size of the farm [herd].
10. For Matt and Cushla part of farming's attraction is the _____ it provides them.

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Discussion Questions

1. What is unique about the geography of New Zealand?
2. Why did New Zealand end all farm subsidies in 1984?
3. How did the elimination of subsidies affect farmers in the short run? What about in the long run?
4. How did opening New Zealand to international trade affect farmers?
5. Why are farmers like Glen Herud trying to minimize the environmental impact of their cows?
6. How do cows affect the level of nitrogen in ground water?
7. What is Glen Herud's business plan with Nature Matters Milk Company?
8. How does technology enable Nature Matters to use less intensive farming methods?
9. Why did Herud need a mobile milking machine?
10. What risks did Herud take on when he decided to develop a mobile milking system?
11. Why doesn't Nature Matters Milk Company homogenize their milk? Why do they pasteurize it?
12. Why do their customers prefer milk from Nature Matters?
13. How do Matt and Cushla Smith use technology to help them run their dairy business?
14. What kinds of decisions do the Smiths use the data for?
15. What is the plate meter used for?
16. Why do Matt and Cushla Smith want to keep their herd fairly small?
17. Why is maximizing production per cow the key to profitability for the Smiths?

18. What makes dairy farming attractive to young New Zealanders?
19. In what ways is farming in New Zealand different than it was 30 years ago?
20. How do you think the removal of subsidies changed the incentives faced by farmers?
21. The percentage of the workforce in farming, in the U.S. and other countries, has declined dramatically over the past 150 years. How has this been possible? What do people do instead of farming? What are some consequences of this change? What do these changes have to do with technology?
22. According to the video, after subsidies were eliminated, New Zealand farmers had to satisfy consumers in order to stay in business. Why is this? Is this a good thing? Discuss.
23. Why do you think New Zealand didn't run out of food when the government stopped subsidizing farmers? Why do you think it continues to be a major agricultural exporter, even with fewer people farming than in the past?
24. According to the video, previous generations of farmers based their business decisions on intuition and experience, whereas Matt and Cushla Smith rely on the latest technology to guide their decision-making. Why might young, inexperienced farmers be more reliant on technology than those with many years of experience? Is the newer method necessarily superior? Explain.

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Activity:

Who chooses? Who benefits? Who pays? What's fair?

These four questions can be a useful tool for evaluating any policy or system. Posing the questions is a great way to stimulate critical thinking. As a class, or in small groups, discuss the following:

(For each question, think broadly about all the possible people or groups of people who may be affected, and remember there may be non-monetary costs and benefits.)

Who benefits from farm subsidies? Who pays? Is this fair? Explain.

When farmers are more productive, how does this affect costs? Who benefits? How?

When farmers choose environmentally friendly practices, who benefits? Who is willing to pay for this?

What are some different approaches to protecting the environment? Who makes the choices under these different approaches? Who benefits? Who pays?

Who benefits from the new technology farmers are employing? Who pays for it?

How is Nature Matters milk different? Why isn't there one standardized way everyone has to sell milk? How does this affect people's choices?

Does technology take away choices from Matt and Cushla Smith? Explain.

Name: _____

Date: _____

They've Got Tech: Next-Gen Farmers **Quiz**

1. Milk for Nature Matters Milk Company is _____ by heating it to 68 degrees C and cooling it.
 - A) homogenized
 - B) pasteurized
 - C) concentrated
 - D) evaporated

2. Too much cow urine can increase the _____ level of groundwater.
 - A) CO₂
 - B) hydrogen
 - C) oxygen
 - D) nitrogen

3. The environmental impact of cows can be reduced by _____.
 - A) giving farmers subsidies
 - B) measuring grass with a plate meter
 - C) increasing the number of cows per acre
 - D) reducing the number of cows per acre

4. New Zealand is an island country of _____ people.
 - A) 45,000
 - B) 450,000
 - C) 4,500,000
 - D) 40, 500,000

5. Before the 1984 economic reforms, _____.
 - A) all dairy products had to be distributed through the New Zealand Dairy Board
 - B) New Zealand farming practices harmed the land and animals
 - C) New Zealand farmers received subsidies from the government
 - D) all of the above

6. Compared to Nature Matters Milk Company, Matt and Cushla Smith's herd is _____.
- A) much larger
 - B) much smaller
 - C) about the same size
 - D) twice as large
7. What has been the impact of technology on New Zealand farming?
- A) It has destroyed jobs.
 - B) It has increased productivity.
 - C) It has reduced exports.
 - D) It has increased reliance on subsidies.
8. Matt and Cushla Smith rely on _____ to help them decide about grazing, feeding, herd size and breeding.
- A) technology
 - B) experience
 - C) intuition
 - D) government experts
9. Why does Glen Herud spread his cows out over a large area rather than keeping them on a smaller plot of land?
- A) He wants to keep his herd size small.
 - B) He wants to reduce their environmental impact.
 - C) There wouldn't be enough grass for them in a smaller area.
 - D) The cows produce more milk when they have more room to graze.
10. A generation after market-based reforms, New Zealand is a world leader in _____ farming.
- A) traditional, low-tech
 - B) large-scale, corporate
 - C) productive, sustainable
 - D) government subsidized

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Enrichment and Integration Activities

Business Plans: Outline the business plans of the two dairy farms featured in the video. In what ways are they similar? How are they different? Compare their goals and strategies. How do they each use technology to help achieve their goals?

Dairy Scavenger Hunt: In your school cafeteria, take note of how many dairy products are available/being used. Or, at home, make a list of all the dairy products you have. Where are most dairy products kept? Why is that?

Research Projects: Work independently or in small groups. Choose one or more of the topics below to learn more about. Gather information from multiple sources to help answer the questions. Create a report that includes both written and visual elements such as pictures, charts, and graphs. Or use technology to present your information in a slide show or video format. Be sure to cite your sources. Share your findings with the class in an oral presentation.

- A. **Pasteurization:** What is pasteurization? What is its purpose? How does it work? What is the history of the process? Why are most of the dairy products we buy pasteurized? Why do some people prefer unpasteurized products? Why are these raw milk products illegal in many places? Should they be? Why or why not?
- B. **Agriculture and Technology:** How has technology changed farming in the U.S. over the past 150 years? Create a timeline of the major technological advances in agriculture. How did each of these changes affect the farm labor force, the number of farms, and farm productivity? How many people worked on farms during each decade? What was the total value of U.S. farm output (in inflation-adjusted dollars)?
- C. **New Zealand Economy:** Besides agriculture, what are New Zealand's other important industries? What goods and services are produced? What is the GDP? How many people are employed in each sector? How do living standards compare to those in the U.S.?
- D. **Agriculture and Geography:** How does geography affect agriculture? Why do countries or regions specialize in certain crops or products? Why is agriculture more important in some places than in others? Choose a region, country, state, or your local community. What are the most important agricultural products in that area, and why?

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Nutritional Labels Activity: Look at the nutritional labels for the following products: heavy cream, half-and-half, whole milk, 2% milk, 1% milk, skim milk, chocolate milk. Create a chart or spreadsheet that compares them. How can a person determine which type of milk would be most beneficial to their diet? How do different options impact recipes? Now also compare labels for a cheese, like cheddar cheese or Gouda, and for processed cheese foods. (American cheese singles, or Velveeta or canned spray cheese.) What differences do you notice in the ingredients of the “real” cheeses and the processed cheese foods? Do all the labels indicate that the product has been pasteurized? How do laws and regulations impact what goes onto food labels?

Writing

- I. Use each of the vocabulary words in an original sentence.
- II. Essay Topics: Choose one or more of the following topics to write about:
 - a) How has the unique geography of New Zealand influenced its economy and society?
 - b) How have environmental concerns affected farming in New Zealand?
 - c) How has technology changed farming in New Zealand?
 - d) What would it be like to earn your living by farming?
- III. Write a persuasive letter to the government encouraging them to allow the purchase of raw milk. Or write a persuasive letter to explain why pasteurization should continue to be enforced for all dairy products. Make sure you do research and back up your argument with facts.
- IV. Interview a local farmer. (If you live in an urban area, perhaps your class could find a farmer to interview using Skype or other similar technology.) Create a list of questions to ask before you go. Find out what types of technology the farmer uses. How has farming changed in his/her lifetime? If you interview in person, take photos and/or video. (With your host's permission, of course!) Present your interview in your chosen format or the one assigned by your teacher: Video, slide show, written interview article.
- V. Write several days' worth of journal/diary entries about daily life from a farmer's POV. (Point of View) (i.e. You are a farmer. Write about your life over several days.)

They've Got Tech: Next-Gen Farmers **Viewing Guide Answer Key**

1. subsidies
2. New Zealand
3. agriculture
4. Deregulation
5. pollutes
6. invented
7. local
8. technologies
9. profit
10. autonomy

Quiz Answer Key

1. B) pasteurized
2. D) nitrogen
3. D) reducing the number of cows per acre
4. C) 4,500,000
5. D) all of the above
6. A) much larger
7. B) It has increased productivity.
8. A) technology
9. B) He wants to reduce the environmental impact.
10. C) productive, sustainable

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