

TWO TRUTHS AND A LIE

SECONDARY AGRICULTURAL LITERACY CARDS

ABOUT THIS RESOURCE:

Put your agricultural knowledge to the test! Each card includes three statements—two are true and one is a lie. Students use what they know, discuss their reasoning, and investigate evidence to determine which statement is false.

The cards are organized around the five National Agricultural Literacy Outcomes (NALO) themes and are designed to build understanding of agriculture through science, food systems, technology, the environment, and society. Cards can also be incorporated into secondary courses such as Biology, Environmental Science, Agricultural Science, Geography, Economics, and other related subjects.

WHAT'S INCLUDED:

5 NALO THEMES • 40 CARDS • 120 STATEMENTS

8 CARDS PER THEME

3 STATEMENTS PER CARD

2 TRUTHS + 1 LIE

THE FIVE NALO THEMES

Each card set is based on one of the five NALO themes.

THEME 1: AGRICULTURE & THE ENVIRONMENT

THEME 2: PLANTS, ANIMALS, & FOOD PRODUCTION

THEME 3: FOOD, HEALTH & NUTRITION

THEME 4: STEM IN AGRICULTURE

THEME 5: AGRICULTURE, SOCIETY & ECONOMY

TWO TRUTHS AND A LIE

SECONDARY AGRICULTURAL LITERACY CARDS

WAYS TO USE THE CARDS:

ROTATIONS

Place cards around the room and have students rotate in teams to identify each lie.

BELL RINGERS

Project or distribute one card at the beginning of class for a quick discussion.

SIDE TO SIDE

Read each statement and have students move to a designated side of the room to show whether they think it is true or false.

RESEARCH CHALLENGE

Have students investigate the statements using credible sources and provide evidence for their answer.

TRIVIA

Divide students into teams and award points for correctly identifying the lie and explaining why.

GO BEYOND THE ANSWER:

Don't stop at identifying the lie. Ask students: "How do you know?"

Encourage students to explain their reasoning, challenge misconceptions, ask questions, and use reliable evidence to support their answers.

NEED MORE SUPPORT?

Corresponding student worksheets are provided for activities that require written responses.

Use the Teacher Answer Key for correct answers, brief explanations, learning connections, and additional resources.

CHOOSE ONE CARD, ONE THEME, OR THE ENTIRE DECK—THE RESOURCE IS DESIGNED TO BE FLEXIBLE.

TWO TRUTHS AND A LIE

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TWO TRUTHS AND A LIE GAME CARDS

NALO THEME 1: AGRICULTURE & THE ENVIRONMENT

AGRICULTURE & THE ENVIRONMENT SOIL	AGRICULTURE & THE ENVIRONMENT WATER
1. Healthy soil contains living organisms that recycle nutrients and support plant growth.	1. Rainfall provides enough water for every crop in every growing region each year.
2. All agricultural soils naturally contain the nutrients crops need every growing season.	2. Farmers may use soil moisture sensors or weather data to help decide when to irrigate crops.
3. Soil texture influences how well water and air move through the ground. 1.1	3. Different irrigation methods can improve water efficiency depending on the crop and climate. 1.2
AGRICULTURE & THE ENVIRONMENT WEATHER AND CLIMATE	AGRICULTURE & THE ENVIRONMENT POLLINATORS
1. Weather forecasts help farmers plan activities such as planting, spraying, and harvesting.	1. Farms include living and nonliving parts that interact as an ecosystem.
2. Climate has little influence on which crops can be grown in a region.	2. Changes in one part of an ecosystem can affect crops, livestock, wildlife, and people.
3. A single weather event can affect crop yields even when farmers have planned carefully. 1.3	3. Agricultural ecosystems function independently from the surrounding environment. 1.4

TWO TRUTHS AND A LIE GAME CARDS

NALO THEME 1: AGRICULTURE & THE ENVIRONMENT

AGRICULTURE & THE ENVIRONMENT BIODIVERSITY	AGRICULTURE & THE ENVIRONMENT CONSERVATION
1. Agricultural landscapes are healthiest when they contain only one plant and one animal species.	1. Bees are the only animals that pollinate agricultural crops.
2. Biodiversity can help agricultural systems become more resilient to pests and environmental changes.	2. Many fruits, vegetables, nuts, and seed crops depend on animal pollinators to reproduce.
3. Native plants can provide food and habitat for beneficial insects and wildlife. 1.5	3. Farmers can use practices that help support pollinator populations on and around farms. 1.6
AGRICULTURE & THE ENVIRONMENT ECOSYSTEMS	AGRICULTURE & THE ENVIRONMENT RENEWABLE RESOURCES
1. Farmers may use conservation practices to reduce soil erosion and protect water quality.	1. Renewable resources can be replenished naturally when they are managed responsibly.
2. Cover crops are one practice that can improve soil health while protecting farmland.	2. Fossil fuels are renewable because they formed naturally underground.
3. Conservation means land cannot be used for agriculture. 1.7	3. Agriculture can produce renewable resources used for food, fiber, fuel, and other products. 1.8

TWO TRUTHS AND A LIE WORKSHEET

AGRICULTURE & THE ENVIRONMENT

NAME: _____ DATE: _____

1.

Topic: _____ What one is the lie? # _____

Why? _____

2.

Topic: _____ What one is the lie? # _____

Why? _____

3.

Topic: _____ What one is the lie? # _____

Why? _____

4.

Topic: _____ What one is the lie? # _____

Why? _____

5.

Topic: _____ What one is the lie? # _____

Why? _____

6.

Topic: _____ What one is the lie? # _____

Why? _____

7.

Topic: _____ What one is the lie? # _____

Why? _____

8.

Topic: _____ What one is the lie? # _____

Why? _____

TWO TRUTHS AND A LIE ANSWER KEY

NALO THEME 1: AGRICULTURE & THE ENVIRONMENT

CARD 1.1

- (Truth) 1. Healthy soil contains living organisms that recycle nutrients and support plant growth.
- (Lie) 2. All agricultural soils naturally contain the nutrients crops need every growing season.
- (Truth) 3. Soil texture influences how well water and air move through the ground.

Explanation/Resources:

Healthy soil contains organisms that recycle nutrients, while soil texture affects how water and air move. However, nutrient levels vary among soils and can change as crops grow. Farmers often use soil testing to determine what nutrients may be needed.

CARD 1.2

- (Lie) 1. Rainfall provides enough water for every crop in every growing region each year.
- (Truth) 2. Farmers may use soil moisture sensors or weather data to help decide when to irrigate crops.
- (Truth) 3. Different irrigation methods can improve water efficiency depending on the crop and climate.

Explanation/Resources:

Crop water needs vary with the crop, soil, weather, and growth stage, so rainfall is not always enough. Farmers may use soil moisture and weather data to guide irrigation. Different irrigation methods can help use water efficiently under different conditions.

CARD 1.3

- (Truth) 1. Weather forecasts help farmers plan activities such as planting, spraying, and harvesting.
- (Lie) 2. Climate has little influence on which crops can be grown in a region.
- (Truth) 3. A single weather event can affect crop yields even when farmers have planned carefully.

Explanation/Resources:

Weather affects short-term farming decisions, while climate influences which crops are suited to a region. Farmers use forecasts when planning activities such as planting, spraying, and harvesting. Extreme weather events can also affect crop growth and yields.

CARD 1.4

- (Truth) 1. Farms include living and nonliving parts that interact as an ecosystem.
- (Truth) 2. Changes in one part of an ecosystem can affect crops, livestock, wildlife, and people.
- (Lie) 3. Agricultural ecosystems function independently from the surrounding environment.

Explanation/Resources:

Farms are ecosystems where living things interact with soil, water, air, sunlight, and each other. They are also connected to surrounding environments. Because these parts interact, a change in one can affect crops, livestock, wildlife, and people.

TWO TRUTHS AND A LIE ANSWER KEY

NALO THEME 1: AGRICULTURE & THE ENVIRONMENT

CARD 1.5

- (Lie) 1. Agricultural landscapes are healthiest when they contain only one plant and one animal species.
- (Truth) 2. Biodiversity can help agricultural systems become more resilient to pests and environmental changes.
- (Truth) 3. Native plants can provide food and habitat for beneficial insects and wildlife.

Explanation/Resources:

Biodiversity can support functions such as pollination, nutrient cycling, and natural pest control. Native plants can provide food and habitat for beneficial insects and wildlife. Agricultural landscapes are not automatically healthier when limited to only a few species.

CARD 1.6

- (Lie) 1. Bees are the only animals that pollinate agricultural crops.
- (Truth) 2. Many fruits, vegetables, nuts, and seed crops depend on animal pollinators to reproduce.
- (Truth) 3. Farmers can use practices that help support pollinator populations on and around farms.

Explanation/Resources:

Many crops depend on animals to move pollen between flowers, but bees are not the only pollinators. Other insects and some vertebrates can also pollinate plants. Farmers can support pollinators by providing flowering plants, habitat, and nesting resources.

CARD 1.7

- (Truth) 1. Farmers may use conservation practices to reduce soil erosion and protect water quality.
- (Truth) 2. Cover crops are one practice that can improve soil health while protecting farmland.
- (Lie) 3. Conservation means land cannot be used for agriculture.

Explanation/Resources:

Conservation practices can protect natural resources while land remains in agricultural production. Practices such as cover crops can reduce erosion, improve soil health, and help protect water quality. Conservation does not require farmland to be taken out of production.

CARD 1.8

- (Truth) 1. Renewable resources can be replenished naturally when they are managed responsibly.
- (Lie) 2. Fossil fuels are renewable because they formed naturally underground.
- (Truth) 3. Agriculture can produce renewable resources used for food, fiber, fuel, and other products.

Explanation/Resources:

Renewable resources can be naturally replenished when managed responsibly. Agriculture produces renewable materials used for food, fiber, fuel, and other products. Fossil fuels are nonrenewable because they take millions of years to form.

TWO TRUTHS AND A LIE GAME CARDS

NALO THEME 2: PLANTS, ANIMALS & FOOD PRODUCTION

PLANTS, ANIMALS & FOOD PRODUCTION PLANT NEEDS	PLANTS, ANIMALS & FOOD PRODUCTION CROP PRODUCTION
1. Plants require water, light, air, and nutrients to grow and reproduce.	1. Farmers plant the same crop every year because crop rotation provides no production benefits.
2. A plant's nutrient and water needs can change during different stages of growth.	2. Farmers consider factors such as soil, climate, and growing season when selecting crops.
3. All crop species grow best under the same soil, temperature, and moisture conditions. 2.1	3. Crop rotation can help manage pests, improve soil health, and diversify production. 2.2
PLANTS, ANIMALS & FOOD PRODUCTION ANIMAL NEEDS	PLANTS, ANIMALS & FOOD PRODUCTION ANIMAL HEALTH
1. Livestock need appropriate food, water, shelter, and care to maintain their health and well-being.	1. Preventive practices such as vaccination, sanitation, and proper nutrition can help protect animal health.
2. All livestock species have the same nutritional, environmental, and housing requirements.	2. Regular observation can help farmers identify changes in an animal's health or behavior.
3. An animal's needs can change with its age, species, health, and stage of production. 2.3	3. Antibiotics prevent every type of disease in livestock, including illnesses caused by viruses. 2.4

TWO TRUTHS AND A LIE GAME CARDS

NALO THEME 2: PLANTS, ANIMALS & FOOD PRODUCTION

PLANTS, ANIMALS & FOOD PRODUCTION ANIMAL BEHAVIOR & WELFARE	PLANTS, ANIMALS & FOOD PRODUCTION PEST MANAGEMENT
1. Animal welfare is determined only by whether an animal receives enough food and water.	1. Integrated pest management can combine biological, cultural, mechanical, and chemical control methods.
2. Farmers can use changes in animal behavior as clues to possible stress, illness, or discomfort.	2. Every insect found in an agricultural field is a pest that damages crops.
3. Housing, handling, nutrition, health, and environmental conditions can all influence animal welfare. 2.5	3. Some insects benefit crop production by pollinating plants or feeding on agricultural pests. 2.6
PLANTS, ANIMALS & FOOD PRODUCTION GENETICS & BREEDING	PLANTS, ANIMALS & FOOD PRODUCTION FOOD, FIBER & ENERGY
1. Selective breeding uses heritable traits to influence characteristics in future generations of plants or animals.	1. Agricultural crops and livestock are produced only for food consumed by people.
2. Different crop varieties and livestock breeds may be better suited to different environments or production goals.	2. Agriculture provides raw materials used to produce food, clothing, fuel, and many other products.
3. Selective breeding changes an individual organism's inherited DNA after it has already developed. 2.7	3. A single agricultural commodity can be processed into several products with different uses. 2.8

TWO TRUTHS AND A LIE WORKSHEET

PLANTS, ANIMALS & FOOD PRODUCTION

NAME: _____ DATE: _____

1.

Topic: _____ What one is the lie? # _____

Why? _____

2.

Topic: _____ What one is the lie? # _____

Why? _____

3.

Topic: _____ What one is the lie? # _____

Why? _____

4.

Topic: _____ What one is the lie? # _____

Why? _____

5.

Topic: _____ What one is the lie? # _____

Why? _____

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Topic: _____ What one is the lie? # _____

Why? _____

7.

Topic: _____ What one is the lie? # _____

Why? _____

8.

Topic: _____ What one is the lie? # _____

Why? _____

TWO TRUTHS AND A LIE ANSWER KEY

NALO THEME 2: PLANTS, ANIMALS & FOOD PRODUCTION

CARD 2.1

- (Truth) 1. Plants require water, light, air, and nutrients to grow and reproduce.
- (Truth) 2. A plant's nutrient and water needs can change during different stages of growth.
- (Lie) 3. All crop species grow best under the same soil, temperature, and moisture conditions.

Explanation/Resources:

Plants need light, water, air, and nutrients, but the amounts they need can change throughout their growth. Different crop species are adapted to different temperatures, soils, and moisture conditions. This is why farmers manage crops according to their specific needs.

CARD 2.2

- (Lie) 1. Farmers plant the same crop every year because crop rotation provides no production benefits.
- (Truth) 2. Farmers consider factors such as soil, climate, and growing season when selecting crops.
- (Truth) 3. Crop rotation can help manage pests, improve soil health, and diversify production.

Explanation/Resources:

Farmers consider soil, climate, growing season, and other conditions when deciding what crops to grow. Growing the same crop continuously is not always beneficial. Crop rotation can improve soil health, interrupt some pest cycles, and diversify production.

CARD 2.3

- (Truth) 1. Livestock need appropriate food, water, shelter, and care to maintain their health and well-being.
- (Lie) 2. All livestock species have the same nutritional, environmental, and housing requirements.
- (Truth) 3. An animal's needs can change with its age, species, health, and stage of production.

Explanation/Resources:

Livestock need appropriate food, water, shelter, and care, but those requirements are not identical across all animals. Needs vary by species, age, health, and stage of production. Farmers adjust management practices to meet these changing needs.

CARD 2.4

- (Truth) 1. Preventive practices such as vaccination, sanitation, and proper nutrition can help protect animal health.
- (Truth) 2. Regular observation can help farmers identify changes in an animal's health or behavior.
- (Lie) 3. Antibiotics prevent every type of disease in livestock, including illnesses caused by viruses.

Explanation/Resources:

Preventive practices such as vaccination, sanitation, nutrition, and regular observation can help maintain livestock health. Antibiotics are used to treat certain bacterial infections, but they do not work against viruses. Monitoring animals can also help identify health concerns early.

TWO TRUTHS AND A LIE ANSWER KEY

NALO THEME 2: PLANTS, ANIMALS & FOOD PRODUCTION

CARD 2.5

- (Lie) 1. Animal welfare is determined only by whether an animal receives enough food and water.
(Truth) 2. Farmers can use changes in animal behavior as clues to possible stress, illness, or discomfort.
(Truth) 3. Housing, handling, nutrition, health, and environmental conditions can all influence animal welfare.

Explanation/Resources:

Animal welfare involves more than providing food and water. Housing, handling, nutrition, health, comfort, and environmental conditions all contribute to an animal's well-being. Changes in behavior can also signal stress, illness, or discomfort.

CARD 2.6

- (Truth) 1. Integrated pest management can combine biological, cultural, mechanical, and chemical control methods.
(Lie) 2. Every insect found in an agricultural field is a pest that damages crops.
(Truth) 3. Some insects benefit crop production by pollinating plants or feeding on agricultural pests.

Explanation/Resources:

Integrated pest management (IPM) uses multiple strategies to manage pests, including biological, cultural, mechanical, and chemical methods. Not every insect in a field is harmful. Some insects provide benefits such as pollination or natural pest control.

CARD 2.7

- (Truth) 1. Selective breeding uses heritable traits to influence characteristics in future generations of plants or animals.
(Truth) 2. Different crop varieties and livestock breeds may be better suited to different environments or production goals.
(Lie) 3. Selective breeding changes an individual organism's inherited DNA after it has already developed.

Explanation/Resources:

Selective breeding uses inherited traits to influence characteristics in future generations. Breeds and varieties can be selected for traits suited to particular environments or production goals. Selective breeding affects future offspring; it does not change an individual organism's inherited DNA during its lifetime.

CARD 2.8

- (Lie) 1. Agricultural crops and livestock are produced only for food consumed by people.
(Truth) 2. Agriculture provides raw materials used to produce food, clothing, fuel, and many other products.
(Truth) 3. A single agricultural commodity can be processed into several products with different uses.

Explanation/Resources:

Agriculture produces much more than food for people. Agricultural commodities provide raw materials for clothing, fuels, and many other products. A single commodity can also be processed into multiple products for different uses.

TWO TRUTHS AND A LIE GAME CARDS

NALO THEME 3: FOOD, HEALTH & NUTRITION

FOOD, HEALTH & NUTRITION NUTRIENTS	FOOD, HEALTH & NUTRITION FOOD GROUPS
1. Different foods provide different combinations and amounts of nutrients needed by the human body.	1. Foods within the same food group provide exactly the same nutrients in the same amounts.
2. A food must provide every essential nutrient to be considered part of a healthy diet.	2. Foods are grouped partly by similarities in the nutrients they provide.
3. Carbohydrates, proteins, fats, vitamins, minerals, and water perform different functions in the body.	3. Eating foods from multiple food groups helps provide a variety of nutrients.
FOOD, HEALTH & NUTRITION FOOD SAFETY	FOOD, HEALTH & NUTRITION FOOD PROCESSING
1. Proper cooking temperatures can destroy many harmful microorganisms that may be present in food.	1. Processing can make some foods safer, last longer, or more convenient to use.
2. Keeping raw foods separate from ready-to-eat foods can help prevent cross-contamination.	2. Any food that has been processed is less nutritious than its unprocessed form.
3. Food that looks and smells normal is always safe to eat.	3. Washing, freezing, pasteurizing, and canning are all examples of food processing.

TWO TRUTHS AND A LIE GAME CARDS

NALO THEME 3: FOOD, HEALTH & NUTRITION

FOOD, HEALTH & NUTRITION FOOD LABELS	FOOD, HEALTH & NUTRITION HEALTHY CHOICES
1. The largest number shown on a Nutrition Facts label identifies the healthiest nutrient in the food.	1. Culture, cost, availability, convenience, and personal preferences can all influence food choices.
2. Serving size provides the basis for the nutrient amounts listed on a Nutrition Facts label.	2. A person's nutritional needs can vary with factors such as age and activity level.
3. Ingredient lists generally identify ingredients in order from greatest to least amount by weight. 3.5	3. Nutrition is the only factor that influences what foods people choose to eat. 3.6
FOOD, HEALTH & NUTRITION FARM TO TABLE	FOOD, HEALTH & NUTRITION FOOD WASTE
1. Food may pass through several stages, including production, processing, transportation, and retail, before being eaten.	1. Food waste occurs only after food has been purchased by a consumer.
2. Most foods travel directly from a farm to the consumer without being handled by other parts of the food system.	2. Food can be lost or wasted during production, processing, distribution, retail, and consumption.
3. Storage and transportation help move agricultural products from where they are produced to where they are consumed. 3.7	3. Reducing food waste can conserve resources used to produce, process, transport, and store food. 3.8

TWO TRUTHS AND A LIE WORKSHEET

FOOD, HEALTH & NUTRITION

NAME: _____ DATE: _____

1.

Topic: _____ What one is the lie? # _____

Why? _____

2.

Topic: _____ What one is the lie? # _____

Why? _____

3.

Topic: _____ What one is the lie? # _____

Why? _____

4.

Topic: _____ What one is the lie? # _____

Why? _____

5.

Topic: _____ What one is the lie? # _____

Why? _____

6.

Topic: _____ What one is the lie? # _____

Why? _____

7.

Topic: _____ What one is the lie? # _____

Why? _____

8.

Topic: _____ What one is the lie? # _____

Why? _____

TWO TRUTHS AND A LIE ANSWER KEY

NALO THEME 3: FOOD, HEALTH & NUTRITION

CARD 3.1

- (Truth) 1. Different foods provide different combinations and amounts of nutrients needed by the human body.
(Lie) 2. A food must provide every essential nutrient to be considered part of a healthy diet.
(Truth) 3. Carbohydrates, proteins, fats, vitamins, minerals, and water perform different functions in the body.

Explanation/Resources:

No single food must supply every nutrient needed by the body. Different foods provide different nutrients, which is why variety is an important part of a healthy eating pattern. Nutrients perform different roles, including providing energy and supporting growth and body functions.

CARD 3.2

- (Lie) 1. Foods within the same food group provide exactly the same nutrients in the same amounts.
(Truth) 2. Foods are grouped partly by similarities in the nutrients they provide.
(Truth) 3. Eating foods from multiple food groups helps provide a variety of nutrients.

Explanation/Resources:

Foods within a food group share nutritional characteristics, but their exact nutrient content varies. Eating a variety of foods across food groups helps provide the body with different nutrients. Foods do not have to be nutritionally identical to belong to the same group.

CARD 3.3

- (Truth) 1. Proper cooking temperatures can destroy many harmful microorganisms that may be present in food.
(Truth) 2. Keeping raw foods separate from ready-to-eat foods can help prevent cross-contamination.
(Lie) 3. Food that looks and smells normal is always safe to eat.

Explanation/Resources:

Safe food handling includes cooking foods properly and preventing cross-contamination between raw and ready-to-eat foods. Harmful microorganisms cannot always be seen, smelled, or tasted. Appearance alone cannot determine whether food is safe.

CARD 3.4

- (Truth) 1. Processing can make some foods safer, last longer, or more convenient to use.
(Lie) 2. Any food that has been processed is less nutritious than its unprocessed form.
(Truth) 3. Washing, freezing, pasteurizing, and canning are all examples of food processing.

Explanation/Resources:

Food processing includes everything from washing and freezing to pasteurization and canning. Processing can improve safety, shelf life, or convenience and does not automatically make a food less nutritious. Different processing methods can affect foods in different ways

TWO TRUTHS AND A LIE ANSWER KEY

NALO THEME 3: FOOD, HEALTH & NUTRITION

CARD 3.5

- (Lie) 1. The largest number shown on a Nutrition Facts label identifies the healthiest nutrient in the food.
- (Truth) 2. Serving size provides the basis for the nutrient amounts listed on a Nutrition Facts label.
- (Truth) 3. Ingredient lists generally identify ingredients in order from greatest to least amount by weight.

Explanation/Resources:

Nutrition Facts labels provide information based on a specified serving size, while ingredient lists generally order ingredients by weight. Larger nutrient numbers do not indicate that a nutrient is healthier. Labels are tools consumers can use to compare foods and make informed choices.

CARD 3.6

- (Truth) 1. Culture, cost, availability, convenience, and personal preferences can all influence food choices.
- (Truth) 2. A person's nutritional needs can vary with factors such as age and activity level.
- (Lie) 3. Nutrition is the only factor that influences what foods people choose to eat.

Explanation/Resources:

Food choices are influenced by more than nutritional value. Culture, cost, access, convenience, preferences, and other factors can affect what people eat. Nutritional needs also vary among individuals and throughout different stages of life.

CARD 3.7

- (Truth) 1. Food may pass through several stages, including production, processing, transportation, and retail, before being eaten.
- (Lie) 2. Most foods travel directly from a farm to the consumer without being handled by other parts of the food system.
- (Truth) 3. Storage and transportation help move agricultural products from where they are produced to where they are consumed.

Explanation/Resources:

Food systems connect farms with processors, distributors, retailers, and consumers. Many foods require transportation, storage, or processing before reaching the table. These steps allow agricultural products to reach consumers beyond the areas where they are produced.

CARD 3.8

- (Lie) 1. Food waste occurs only after food has been purchased by a consumer.
- (Truth) 2. Food can be lost or wasted during production, processing, distribution, retail, and consumption.
- (Truth) 3. Reducing food waste can conserve resources used to produce, process, transport, and store food.

Explanation/Resources:

Food loss and waste can occur throughout the food system, not just in homes. Producing food requires resources such as land, water, energy, and labor. Preventing edible food from being wasted can therefore conserve resources as well as food.

TWO TRUTHS AND A LIE GAME CARDS

NALO THEME 4: STEM IN AGRICULTURE

STEM IN AGRICULTURE ENGINEERING	STEM IN AGRICULTURE ROBOTICS & AUTOMATION
1. Agricultural engineers design systems and equipment that can improve efficiency, safety, and resource use.	1. Agricultural robots can perform only repetitive indoor tasks because outdoor conditions are too unpredictable.
2. Engineering solutions in agriculture must account for factors such as biology, environment, cost, and safety.	2. Robotic systems can perform agricultural tasks such as milking, harvesting, weeding, and crop monitoring.
3. Agricultural engineering is limited to designing tractors and other farm machinery. 4.1	3. Sensors and computer systems can allow agricultural machines to respond to changing conditions. 4.2
STEM IN AGRICULTURE PRECISION AGRICULTURE	STEM IN AGRICULTURE GPS & GIS
1. Precision agriculture uses location-specific data to help manage variation within fields and agricultural operations.	1. GPS can provide location information that helps agricultural equipment navigate fields accurately.
2. Precision agriculture requires farmers to apply the same amount of seed, fertilizer, and water across an entire field.	2. GIS can combine layers of geographic data to reveal patterns and relationships useful in agriculture.
3. Variable-rate technology can adjust agricultural inputs based on data about conditions in different locations. 4.3	3. GPS and GIS are interchangeable technologies that perform exactly the same function. 4.4

TWO TRUTHS AND A LIE GAME CARDS

NALO THEME 4: STEM IN AGRICULTURE

STEM IN AGRICULTURE BIOTECHNOLOGY	STEM IN AGRICULTURE DATA & SENSORS
1. Agricultural biotechnology refers only to genetically engineering plants in a laboratory.	1. Agricultural sensors can collect information about conditions such as soil moisture, temperature, or animal activity.
2. Biotechnology uses living organisms, cells, or biological processes to develop or improve products and processes.	2. Collecting more agricultural data automatically guarantees better management decisions.
3. Agricultural biotechnology can be applied to plants, animals, microorganisms, food, and other biological systems. 4.5	3. Agricultural data must be interpreted and applied appropriately before it can support management decisions. 4.6
STEM IN AGRICULTURE REMOTE SENSING	STEM IN AGRICULTURE AGRICULTURAL INNOVATION
1. Satellites, aircraft, and drones can collect information about agricultural land without directly touching it.	1. New agricultural technology is successful whenever it increases production, regardless of its cost or other impacts.
2. Remote sensing can help identify patterns in vegetation, moisture, or crop stress across a field.	2. Agricultural innovations often address challenges involving productivity, labor, resources, environmental conditions, or food systems.
3. Remote sensing images can always identify the exact cause of a crop problem without additional investigation. 4.7	3. Scientists and engineers test and refine agricultural technologies before and after they are put into use. 4.8

TWO TRUTHS AND A LIE WORKSHEET

STEM IN AGRICULTURE

NAME: _____ DATE: _____

1.

Topic: _____ What one is the lie? # _____

Why? _____

2.

Topic: _____ What one is the lie? # _____

Why? _____

3.

Topic: _____ What one is the lie? # _____

Why? _____

4.

Topic: _____ What one is the lie? # _____

Why? _____

5.

Topic: _____ What one is the lie? # _____

Why? _____

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Topic: _____ What one is the lie? # _____

Why? _____

7.

Topic: _____ What one is the lie? # _____

Why? _____

8.

Topic: _____ What one is the lie? # _____

Why? _____

TWO TRUTHS AND A LIE ANSWER KEY

NALO THEME 4: STEM IN AGRICULTURE

CARD 4.1

- (Truth) 1. Agricultural engineers design systems and equipment that can improve efficiency, safety, and resource use.
- (Truth) 2. Engineering solutions in agriculture must account for factors such as biology, environment, cost, and safety.
- (Lie) 3. Agricultural engineering is limited to designing tractors and other farm machinery.

Explanation/Resources:

Agricultural engineering extends far beyond machinery and can include irrigation, structures, energy, environmental systems, and food processing. Engineers consider multiple constraints when developing solutions. Their work applies engineering principles to challenges throughout agriculture and food systems.

CARD 4.2

- (Lie) 1. Agricultural robots can perform only repetitive indoor tasks because outdoor conditions are too unpredictable.
- (Truth) 2. Robotic systems can perform agricultural tasks such as milking, harvesting, weeding, and crop monitoring.
- (Truth) 3. Sensors and computer systems can allow agricultural machines to respond to changing conditions.

Explanation/Resources:

Robotics and automation are used in both indoor and outdoor agricultural environments. Depending on the system, robots can milk animals, monitor crops, remove weeds, or assist with harvesting. Sensors and software allow many systems to collect information and respond to their surroundings.

CARD 4.3

- (Truth) 1. Precision agriculture uses location-specific data to help manage variation within fields and agricultural operations.
- (Lie) 2. Precision agriculture requires farmers to apply the same amount of seed, fertilizer, and water across an entire field.
- (Truth) 3. Variable-rate technology can adjust agricultural inputs based on data about conditions in different locations.

Explanation/Resources:

Precision agriculture uses data to manage differences within fields rather than treating every location identically. Variable-rate technology can adjust inputs such as seed or fertilizer according to mapped or sensed conditions. This can help farmers make more targeted management decisions.

CARD 4.4

- (Truth) 1. GPS can provide location information that helps agricultural equipment navigate fields accurately.
- (Truth) 2. GIS can combine layers of geographic data to reveal patterns and relationships useful in agriculture.
- (Lie) 3. GPS and GIS are interchangeable technologies that perform exactly the same function.

Explanation/Resources:

GPS determines location, while GIS stores, maps, and analyzes geographically referenced information. Agriculture can use both technologies together for navigation, field mapping, and spatial analysis. They are related tools, but they perform different functions.

TWO TRUTHS AND A LIE ANSWER KEY

NALO THEME 4: STEM IN AGRICULTURE

CARD 4.5

- (Lie) 1. Agricultural biotechnology refers only to genetically engineering plants in a laboratory.
- (Truth) 2. Biotechnology uses living organisms, cells, or biological processes to develop or improve products and processes.
- (Truth) 3. Agricultural biotechnology can be applied to plants, animals, microorganisms, food, and other biological systems.

Explanation/Resources:

Biotechnology is broader than genetic engineering and includes many ways biological systems are used to create or improve products. Agricultural biotechnology can involve plants, animals, microorganisms, and food systems. Genetic engineering is one biotechnology tool, not the entire field.

CARD 4.6

- (Truth) 1. Agricultural sensors can collect information about conditions such as soil moisture, temperature, or animal activity.
- (Lie) 2. Collecting more agricultural data automatically guarantees better management decisions.
- (Truth) 3. Agricultural data must be interpreted and applied appropriately before it can support management decisions.

Explanation/Resources:

Sensors allow farmers and researchers to continuously collect information about crops, animals, soil, and environmental conditions. However, data alone does not guarantee a good decision. Information must be accurate, interpreted correctly, and considered alongside other factors.

CARD 4.7

- (Truth) 1. Satellites, aircraft, and drones can collect information about agricultural land without directly touching it.
- (Truth) 2. Remote sensing can help identify patterns in vegetation, moisture, or crop stress across a field.
- (Lie) 3. Remote sensing images can always identify the exact cause of a crop problem without additional investigation.

Explanation/Resources:

Remote sensing gathers information from a distance using sensors on platforms such as satellites, aircraft, or drones. The resulting data can reveal patterns that may indicate crop stress or other differences. Those patterns often require additional observations or testing to determine their exact cause.

CARD 4.8

- (Lie) 1. New agricultural technology is successful whenever it increases production, regardless of its cost or other impacts.
- (Truth) 2. Agricultural innovations often address challenges involving productivity, labor, resources, environmental conditions, or food systems.
- (Truth) 3. Scientists and engineers test and refine agricultural technologies before and after they are put into use.

Explanation/Resources:

Successful innovation involves more than increasing production. Agricultural technologies may also be evaluated for cost, safety, reliability, resource use, and environmental or social impacts. Testing and refinement help determine whether a technology effectively addresses the problem it was designed to solve.

TWO TRUTHS AND A LIE GAME CARDS

NALO THEME 5: AGRICULTURE, SOCIETY & ECONOMY

AGRICULTURE, SOCIETY & ECONOMY AGRICULTURAL CAREERS	AGRICULTURE, SOCIETY & ECONOMY AGRICULTURAL ECONOMICS
1. Agricultural careers include fields such as science, engineering, business, communications, technology, and natural resources.	1. Agricultural prices are determined only by how much it costs farmers to produce a product.
2. Most careers in agriculture require employees to work directly on a farm or ranch.	2. Changes in supply and demand can influence the prices of agricultural products.
3. Producing and delivering agricultural products requires workers with many different types of education and skills. 5.1	3. Weather, production costs, consumer demand, and global markets can all affect agricultural businesses. 5.2
AGRICULTURE, SOCIETY & ECONOMY GEOGRAPHY & AGRICULTURE	AGRICULTURE, SOCIETY & ECONOMY AGRICULTURAL TRADE
1. Climate, soil, water availability, and landforms can influence which agricultural products are produced in a region.	1. Agricultural trade allows regions to exchange products they produce efficiently for products produced elsewhere.
2. Transportation and access to markets can influence where agricultural production and processing occur.	2. Countries that produce agricultural products domestically have no reason to import similar products.
3. Modern technology has eliminated geography as an important factor in agricultural production. 5.3	3. Seasonal availability, consumer demand, prices, and production conditions can influence agricultural trade. 5.4

TWO TRUTHS AND A LIE GAME CARDS

NALO THEME 5: AGRICULTURE, SOCIETY & ECONOMY

AGRICULTURE, SOCIETY & ECONOMY FOOD & AGRICULTURAL SUPPLY CHAINS	AGRICULTURE, SOCIETY & ECONOMY AGRICULTURE & COMMUNITIES
1. Agricultural supply chains begin at the grocery store because that is where consumers first encounter food products.	1. Agricultural businesses can contribute jobs, income, and economic activity to rural and urban communities.
2. Agricultural supply chains can include production, processing, transportation, distribution, retail, and consumption.	2. Agriculture affects rural communities but has little connection to cities or urban economies.
3. Disruptions in one part of a supply chain can affect the availability or price of products elsewhere. 5.5	3. Processing, transportation, research, retail, and food service connect agriculture to communities beyond farms and ranches. 5.6
AGRICULTURE, SOCIETY & ECONOMY AGRICULTURE & CULTURE	AGRICULTURE, SOCIETY & ECONOMY AGRICULTURAL DECISIONS & SOCIETY
1. Culture and traditions can influence which foods people produce, prepare, and eat.	1. Agricultural decisions affect only producers because consumers are separate from the agricultural system.
2. Agricultural practices and food traditions can change as people, technologies, and ideas move between regions.	2. Consumer choices can influence demand for particular agricultural products and production practices.
3. Agricultural practices develop independently of a society's history, values, and traditions. 5.7	3. Agricultural decisions may involve economic, environmental, social, and technological considerations. 5.8

TWO TRUTHS AND A LIE WORKSHEET

AGRICULTURE, SOCIETY & ECONOMY

NAME: _____ DATE: _____

1.

Topic: _____ What one is the lie? # _____

Why? _____

2.

Topic: _____ What one is the lie? # _____

Why? _____

3.

Topic: _____ What one is the lie? # _____

Why? _____

4.

Topic: _____ What one is the lie? # _____

Why? _____

5.

Topic: _____ What one is the lie? # _____

Why? _____

6.

Topic: _____ What one is the lie? # _____

Why? _____

7.

Topic: _____ What one is the lie? # _____

Why? _____

8.

Topic: _____ What one is the lie? # _____

Why? _____

TWO TRUTHS AND A LIE ANSWER KEY

NALO THEME 5: AGRICULTURE, SOCIETY & ECONOMY

CARD 5.1

(Truth) 1. Agricultural careers include fields such as science, engineering, business, communications, technology, and natural resources.

(Lie) 2. Most careers in agriculture require employees to work directly on a farm or ranch.

(Truth) 3. Producing and delivering agricultural products requires workers with many different types of education and skills.

Explanation/Resources:

Agriculture includes careers throughout food, fiber, natural resource, business, science, and technology systems. Many agricultural professionals never work directly on a farm or ranch. Different careers also require different combinations of education, training, and technical skills.

CARD 5.2

(Lie) 1. Agricultural prices are determined only by how much it costs farmers to produce a product.

(Truth) 2. Changes in supply and demand can influence the prices of agricultural products.

(Truth) 3. Weather, production costs, consumer demand, and global markets can all affect agricultural businesses.

Explanation/Resources:

Agricultural prices are influenced by supply, demand, markets, and many other factors—not production cost alone. Weather and input costs can affect supply, while consumer preferences can affect demand. Agricultural businesses make decisions within these changing economic conditions.

CARD 5.3

(Truth) 1. Climate, soil, water availability, and landforms can influence which agricultural products are produced in a region.

(Truth) 2. Transportation and access to markets can influence where agricultural production and processing occur.

(Lie) 3. Modern technology has eliminated geography as an important factor in agricultural production.

Explanation/Resources:

Technology can expand agricultural possibilities, but geography still matters. Climate, soil, water, terrain, transportation, and markets influence what can be produced efficiently in different places. These factors help explain why regions often specialize in particular agricultural products.

CARD 5.4

(Truth) 1. Agricultural trade allows regions to exchange products they produce efficiently for products produced elsewhere.

(Lie) 2. Countries that produce agricultural products domestically have no reason to import similar products.

(Truth) 3. Seasonal availability, consumer demand, prices, and production conditions can influence agricultural trade.

Explanation/Resources:

Countries may both produce and import similar agricultural products because markets vary by season, price, quality, and consumer demand. Trade connects agricultural producers and consumers across regions and countries. Production advantages also differ among locations.

TWO TRUTHS AND A LIE ANSWER KEY

NALO THEME 5: AGRICULTURE, SOCIETY & ECONOMY

CARD 5.5

- (Lie) 1. Agricultural supply chains begin at the grocery store because that is where consumers first encounter food products.
- (Truth) 2. Agricultural supply chains can include production, processing, transportation, distribution, retail, and consumption.
- (Truth) 3. Disruptions in one part of a supply chain can affect the availability or price of products elsewhere.

Explanation/Resources:

Agricultural supply chains begin before products reach stores and connect many stages from production to consumption. Transportation, processing, storage, and distribution help move products through the system. A disruption at one stage can create effects elsewhere in the chain.

CARD 5.6

- (Truth) 1. Agricultural businesses can contribute jobs, income, and economic activity to rural and urban communities.
- (Lie) 2. Agriculture affects rural communities but has little connection to cities or urban economies.
- (Truth) 3. Processing, transportation, research, retail, and food service connect agriculture to communities beyond farms and ranches.

Explanation/Resources:

Agriculture connects rural and urban communities through employment, businesses, transportation, processing, research, and food systems. Agricultural products often move through many communities before reaching consumers. Its economic influence therefore extends well beyond farms and ranches.

CARD 5.7

- (Truth) 1. Culture and traditions can influence which foods people produce, prepare, and eat.
- (Truth) 2. Agricultural practices and food traditions can change as people, technologies, and ideas move between regions.
- (Lie) 3. Agricultural practices develop independently of a society's history, values, and traditions.

Explanation/Resources:

Agriculture and food are closely connected to culture, history, and traditions. Migration, trade, technology, and changing preferences can influence both foodways and agricultural practices. Agriculture can therefore both shape society and be shaped by it.

CARD 5.8

- (Lie) 1. Agricultural decisions affect only producers because consumers are separate from the agricultural system.
- (Truth) 2. Consumer choices can influence demand for particular agricultural products and production practices.
- (Truth) 3. Agricultural decisions may involve economic, environmental, social, and technological considerations.

Explanation/Resources:

Producers and consumers are interconnected parts of agricultural and food systems. Consumer demand can influence what products are produced and marketed. Agricultural decisions may also involve tradeoffs among economic, environmental, technological, and social factors.