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# AgLIT: Agricultural Literacy through Innovative Technology

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A FULLY STEM-INTEGRATED, PROJECT-BASED,  
UPPER-ELEMENTARY CURRICULUM MODULE

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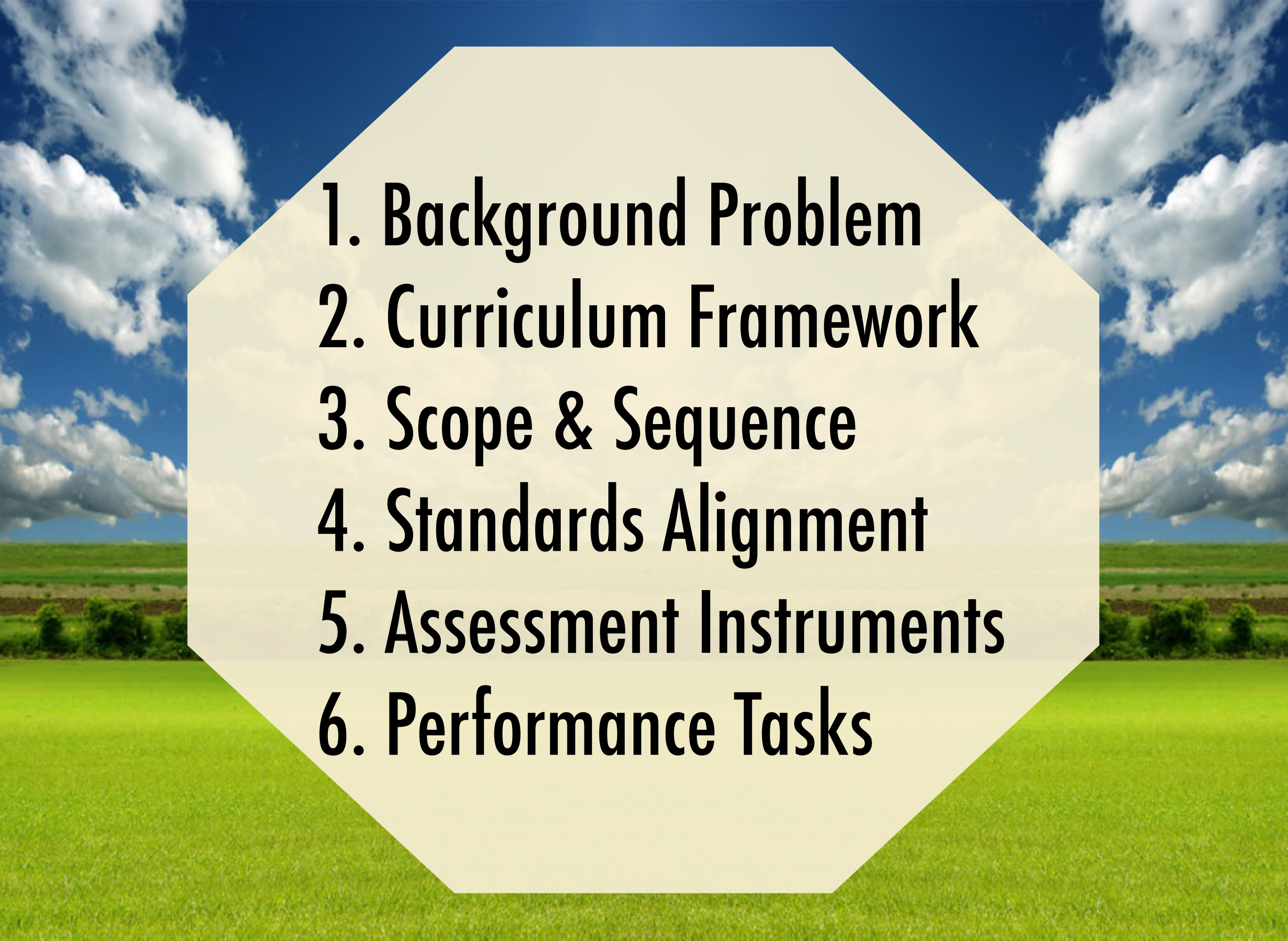
“ *I never drink any milk that comes from an animal.* ”

“ *Where does your milk come from then?* ”

“ *Wegman's.* ”

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- 1. Background Problem**
  - 2. Curriculum Framework**
  - 3. Scope & Sequence**
  - 4. Standards Alignment**
  - 5. Assessment Instruments**
  - 6. Performance Tasks**





**The PROBLEM**





“Education is not about  
the filling of a pail, but the  
lighting of a fire.”

- W.B. Yeats

**Kids need agriculture.  
Seriously.**





**They need STEM literacy, too.**



7

# S

## Science

both a body of knowledge and a process for acquiring that knowledge, known as the scientific method

/ˈsiəns/

from Latin *scientia* meaning "knowledge"



10

# T

## Technology

the application of scientific knowledge for practical purposes

/tekˈnɒləʒi/

from Greek *tekhnologia* meaning "systematic treatment"



11

# E

## Engineering

the action of working artfully to bring something about

/enjəˈni(ə)rɪŋ/

from Latin *ingeniare* meaning "conceive, devise"



11

# M

## Mathematics

the abstract science of number, quantity, and space

/məˈθ(ə)mətiks/

from Greek *mathēmatikē* meaning "learn"







**READING**

**MATH**

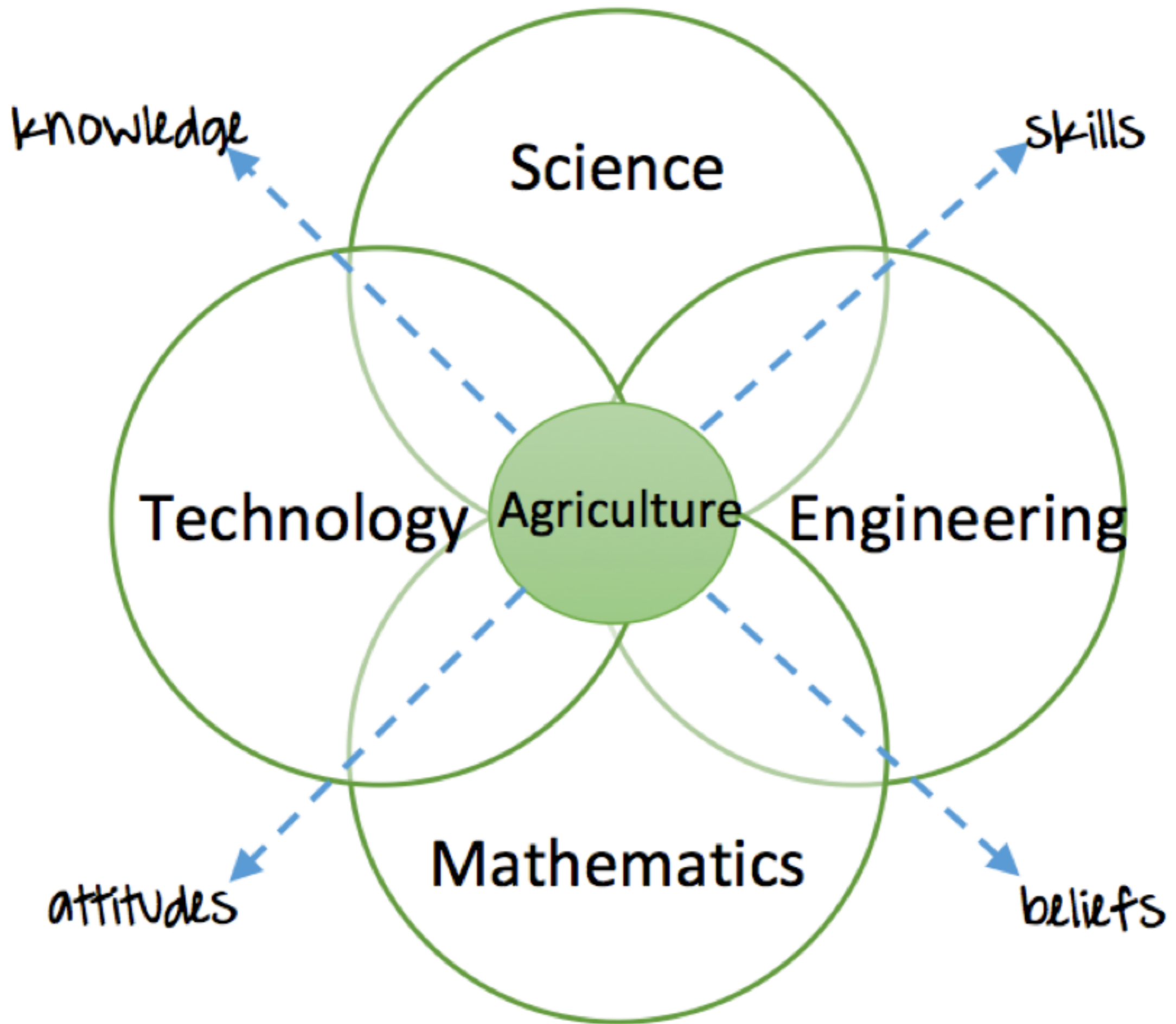
**SCIENCE**

**OTHER  
STUFF**





# CURRICULUM FRAMEWORK







ArcGIS®



AURASMA



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“

*How will you help Farmer  
Kathy prepare for the  
farmers' market?*

”

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# SCOPE & SEQUENCE



Day	Agricultural Topic	Type of Learning Activity			
		Science	Technology	Engineering	Mathematics
Prior	Pretests				-
1	General Agriculture & Life Cycles	-	Exploring U.S. Farm Data w/Web GIS	-	-
2	Food & Nutrition	-	Pizza Party w/AR	-	-
3	Plants, Agronomy, & Horticulture	-	-	Design a Garden w/Google Earth	-
4	Livestock, Meat, & Poultry	-	-	Design an Egg Transport System	-
5	Dairy	-	-	-	Making Mozzarella
6	Fiber	Plant & Animal Fibers	-	-	-
7	Land & Natural Resources	Water & Soil Investigation	-	-	-
8	Environment & Sustainability	-	-	-	Sustainable Marketing Plan - Part I
9	Agriscience & Biotechnology	Sustainable Marketing Plan - Part II	Sustainable Marketing Plan - Part II	Sustainable Marketing Plan - Part II	Sustainable Marketing Plan - Part II
10	Conclusion	(What to Grow & Sell)	(Virtual Brochure)	(Farm Stand Model)	(Trends & Pricing)
11	Posttests and Field Trip to the Farm				





**The iBook**



# Introduction



This book is your passport to an adventure in agriculture! Throughout the unit you will learn about the importance of agriculture, participate in hands-on activities, and produce your own agricultural products.

Your ultimate goal is to help Farmer Kathy prepare her products for the farmers' market. You and your group will study each component of the agricultural system and explore the processes involved in getting raw materials and their by-products to consumers. Have fun on your journey!

## The Agricultural System

- 1) General Agriculture, Animals, & Life Cycles
- 2) Food & Nutrition
- 3) Plants, Agronomy, & Horticulture
- 4) Livestock, Meat, & Poultry
- 5) Dairy
- 6) Fiber
- 7) Land & Natural Resources
- 8) Environment & Sustainability
- 9) Agriscience & Biotechnology

### Driving Question

How will you help Farmer Kathy prepare for the farmers' market?

### What is a Farmers' Market?



# 1

## General Agriculture, Animals, & Life Cycles

“Look deep into nature, and then you will understand everything better.”

– Albert Einstein







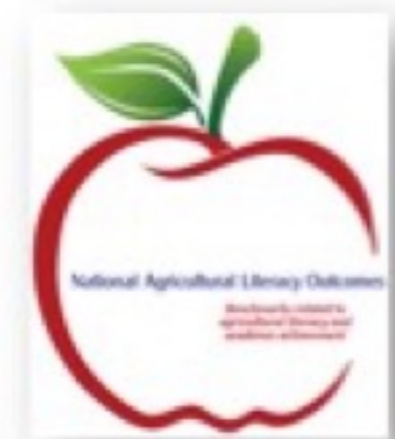
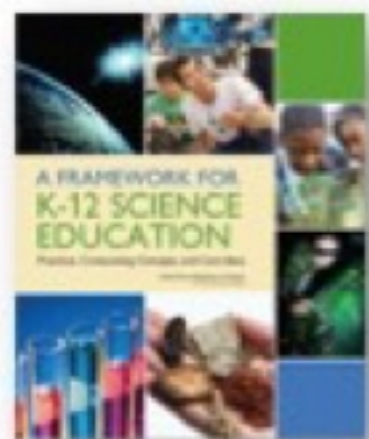
# STANDARDS ALIGNMENT



# AglIT



Agricultural Literacy through Innovative Technology





<b>NALO</b>	<b>FFSL</b>	<b>CCSS</b>	<b>NGSS</b>	<b>STATE</b>
<b>Gain Awareness of Global Interconnectedness:</b>				
Culture, Society, Economy & Geography.1. Provide examples of agricultural products available, but not produced in their local area and state.	4.5.IV.D.1. Students will explain why nations trade products and services.	---	5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.	3.4.4.D3. Investigate and assess the influence of a specific technology or system on the individual, family, community, and environment.
<b>Acquire Conscientiousness of the Future:</b>				
Agriculture and the Environment.4. Identify land and water conservation methods used in farming systems.	4-5.III.D.1. Students will explain how technological advancements enhance Food and Fiber Systems' efficiency.	---	4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.	3.4.4.B3. Explain why new technologies are developed and old ones are improved in terms of needs and wants.
<b>Identify Applications of the Subject(s) in Practice:</b>				
Science, Technology, Engineering & Mathematics.4. Provide examples of science being applied in farming for food, clothing, and shelter products.	4-5.I.E.1. Students will examine the changes in Food and Fiber Systems due to technological advances, and subsequent changes in occupational opportunities. They will identify agricultural careers and how they have changed.	4.MD.A.3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems.	4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.	3.4.4.C2. Describe the engineering design process: Define a problem. Generate ideas. Select a solution and test it. Make the item. Evaluate the item. Communicate the solution with others. Present the results.
<b>Design Models, Diagrams, and Drawings:</b>				
Food, Health, and Lifestyle.2. Diagram the path of production for a processed product, from farm to table.	4-5.V.B.1. Students will identify the six basic food nutrients: carbohydrates, protein, water, vitamins, minerals, and fats. They will categorize foods based on nutritional content.	4.NF.B.3.D. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	3.1.4 B5. PATTERNS. Identify observable patterns in the physical characteristics of plants or groups of animals.





# ASSESSMENT INSTRUMENTS





Name \_\_\_\_\_ ID \_\_\_\_\_

Please circle the best answer to each question.

1. One reason that United States farmers can produce a great variety of agricultural by-products is that:
  - a. The growing seasons are all short.
  - b. United States farmers are smarter than other farmers.
  - c. The United States has diverse climates, soils, and weather.
  - d. Rainfall in the United States is the same all over the country.



Name \_\_\_\_\_ ID \_\_\_\_\_

Please rate how much you personally agree or disagree with each of the following statements.

		I Agree	Not Sure	I Disagree
1	Scientists help make people's lives better.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	Engineers help make people's lives better.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	Even farm animals should be treated well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Question / Criteria	Exemplary (4)	Proficient (3)	Adequate (2)	Needs Improvement (1)	Insufficient Response (0)
	All listed activities are identified with clear illustration, specific examples.	At least half of the listed activities are depicted with general examples but lack sufficient detail.	Activities are vague but accurate.	Activities are ambiguous and include misunderstandings.	Students did not address components of the question.
<b>Analyze current market trends (math)</b> <i>Information/Media Literacy</i> Students identify important current market trends and successfully analyze graphic data. See Task Answers for correct responses.	Students identified and described the most important trends effectively and successfully read the charts 4 correct	Students identified and described the important trends effectively but did not read all of the charts successfully 3 correct	Students identified and described some important trends adequately and did not read all of the charts successfully 2 correct	Students identified and described some important trends adequately but did not read most of the charts successfully 1 correct	Students did not identify the important trends or explain the charts successfully Zero correct

KnowASTE  
knowledge

ThinkASTE  
attitudes

PBL Tasks  
skills



1  
school

4  
teachers

95  
students





	Treatment Group						Control Group						Effect Sizes Partial $\eta^2$
	Class A (N=20)		Class B (N=22)		Treatment (N=42)		Class C (N=18)		Class D (N=20)		Control (N=38)		
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	
<i>Knowledge</i>													
KnowASTE Pretest	9.70	3.59	12.95	3.44	11.40	3.84	9.67	2.85	9.80	2.93	9.74	2.85	.231
KnowASTE Posttest	13.30	3.57	15.27	3.10	14.33	3.43	9.56	2.31	9.95	3.03	9.76	2.69	
Percent Change	37.1%	--	17.9%	--	25.7%	--	-1.1%	--	1.5%	--	0.2%	--	
<i>Attitudes/Beliefs</i>													
ThinkASTE Pretest	64.60	3.80	65.18	4.98	64.90	4.41	62.11	5.39	60.05	5.81	61.03	5.64	.253
ThinkASTE Posttest	70.05	3.71	67.77	4.93	68.86	4.49	63.17	4.83	61.50	6.50	62.29	5.76	
Percent Change	8.4%	--	4.0%	--	6.1%	--	1.7%	--	2.4%	--	2.1%	--	
<i>Skills</i>													
Culminating Project	12.50	3.97	16.98	1.69	14.85	3.73	--	--	--	--	--	--	

Note. The KnowASTE instrument's range was 0-27. The ThinkASTE instrument's range was 27-81, and the culminating project rubric's range was 0-20.

# DESCRIPTIVE STATISTICS...



# 4TH GRADE AGRICULTURE LESSONS



PERFORMANCE TASKS



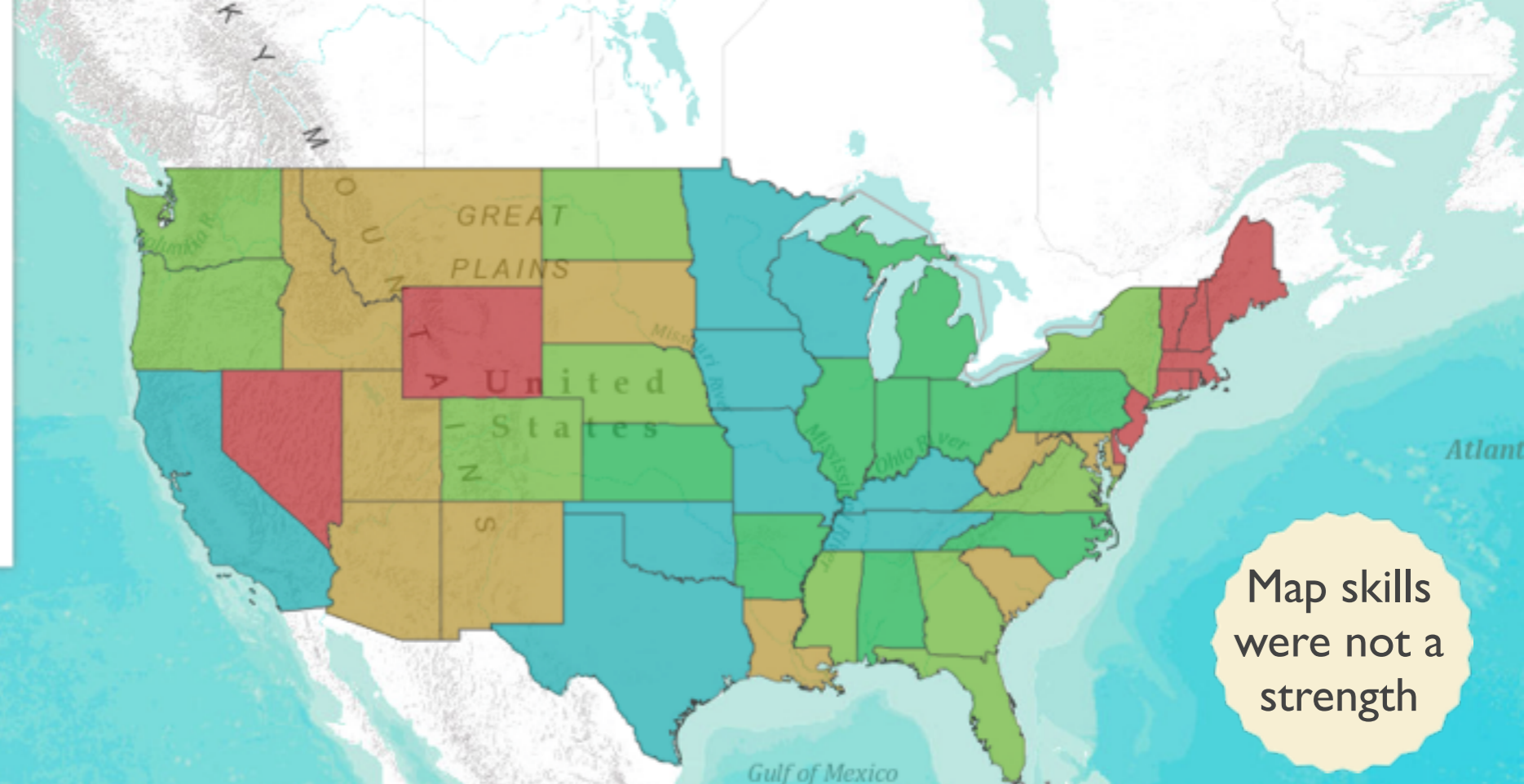
### Number of Farms in 2010

- 1,219 - 11,069
- 11,069 - 31,169
- 31,169 - 47,846
- 47,846 - 76,860
- 76,860 - 247,437

Current Selection:

Number of Farms in 2010

Select a different item from the list to view another map.



1. What part of the country had the smallest number of farms in 1900?

The west

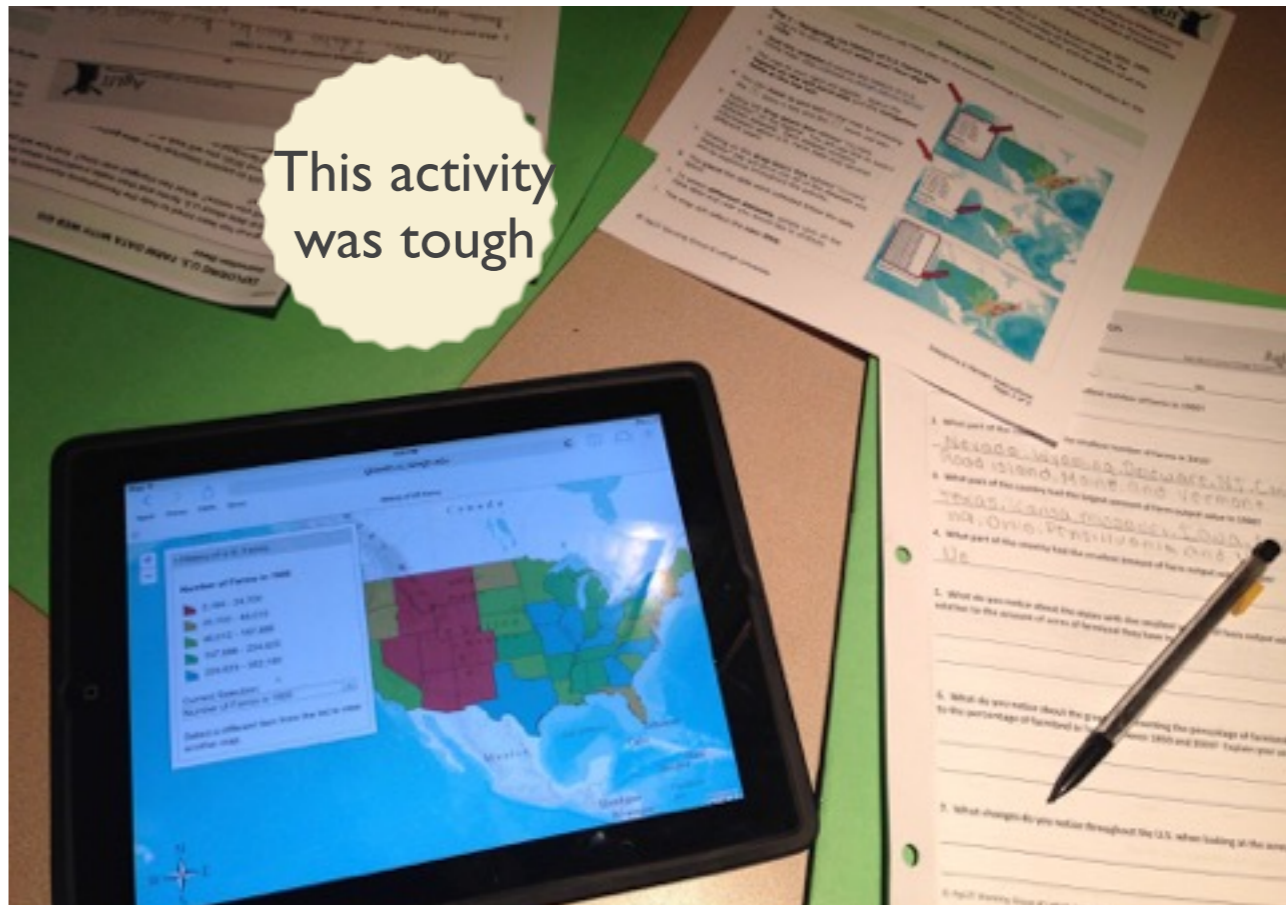
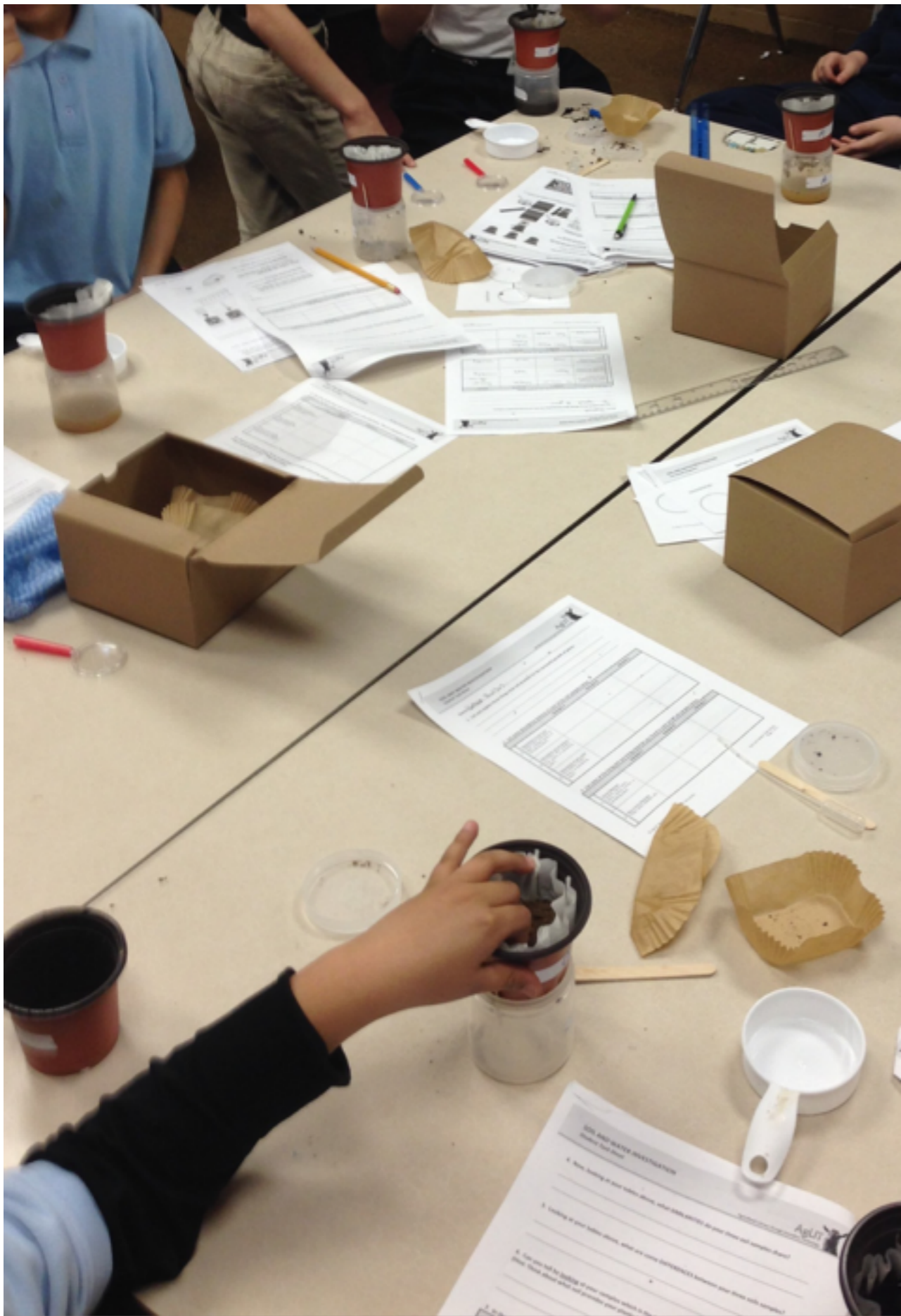
2. What part of the country had the smallest number of farms in 2010?

Nevada, Wyoming, Delaware, NJ, Connecticut, Rhode Island, Maine, and Vermont.

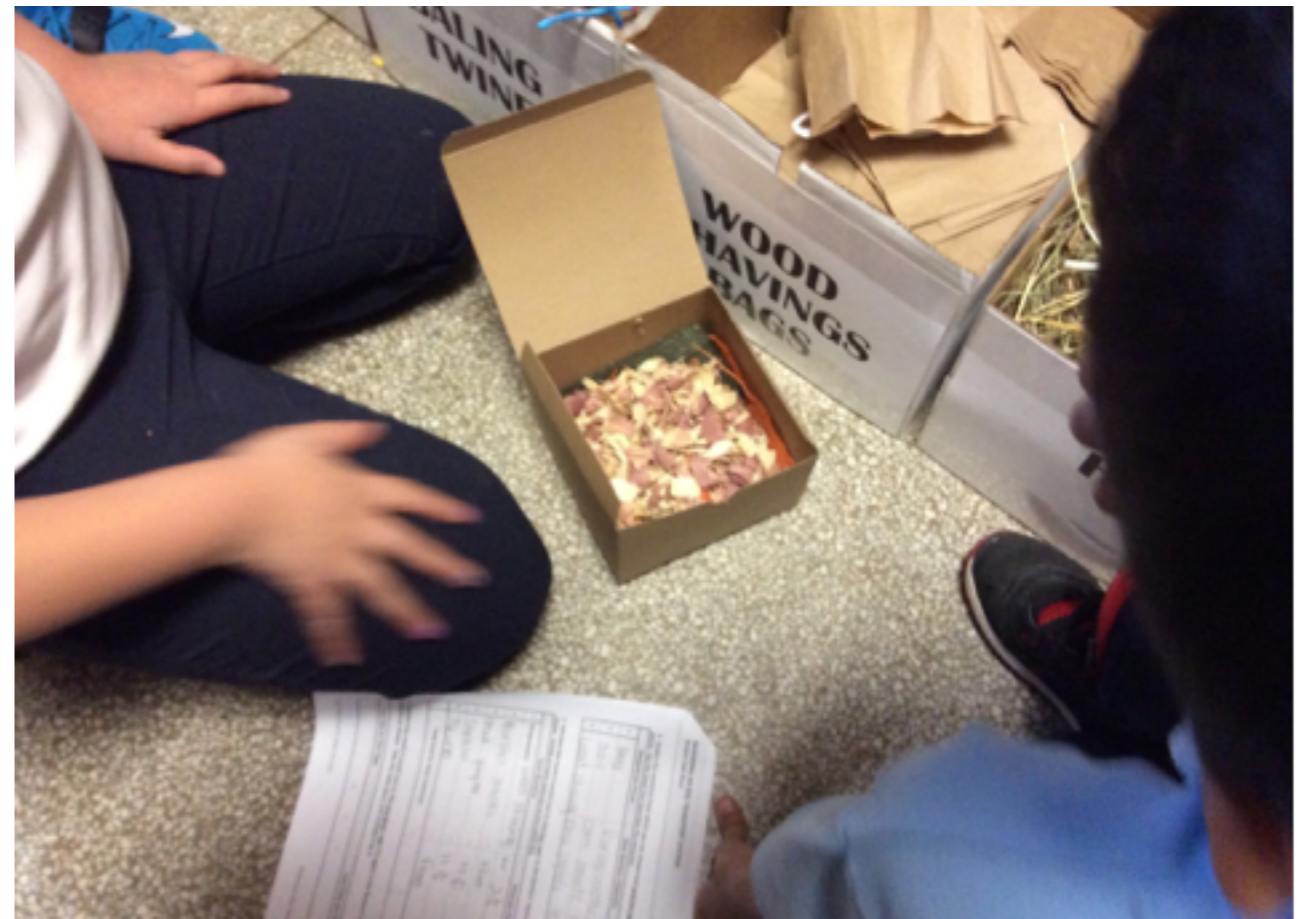
3. What part of the country had the largest amount of farm output value in 1900?

Texas, Kansas, Missouri, Iowa, Illinois, Indiana, Ohio, Pennsylvania and NY.

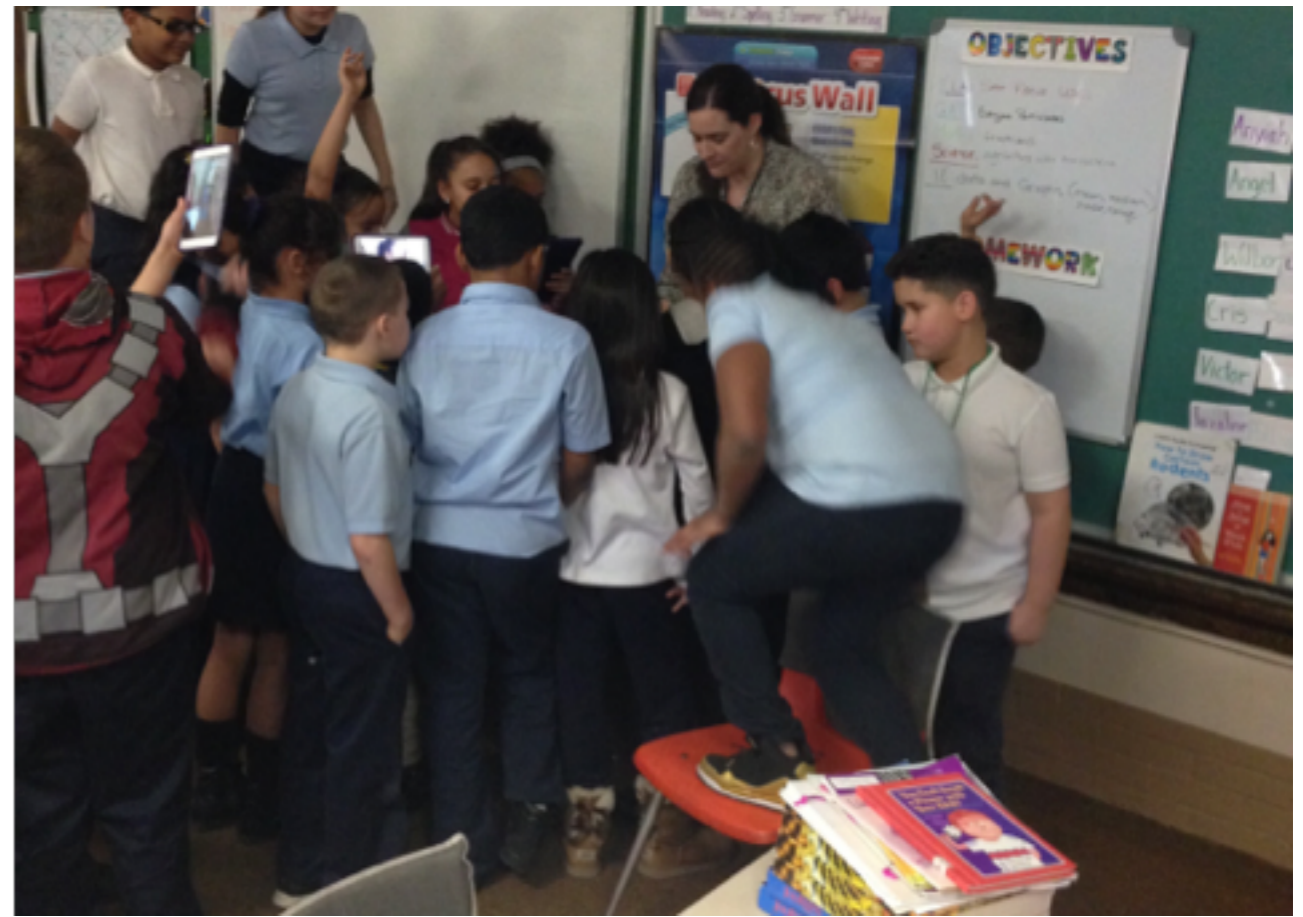
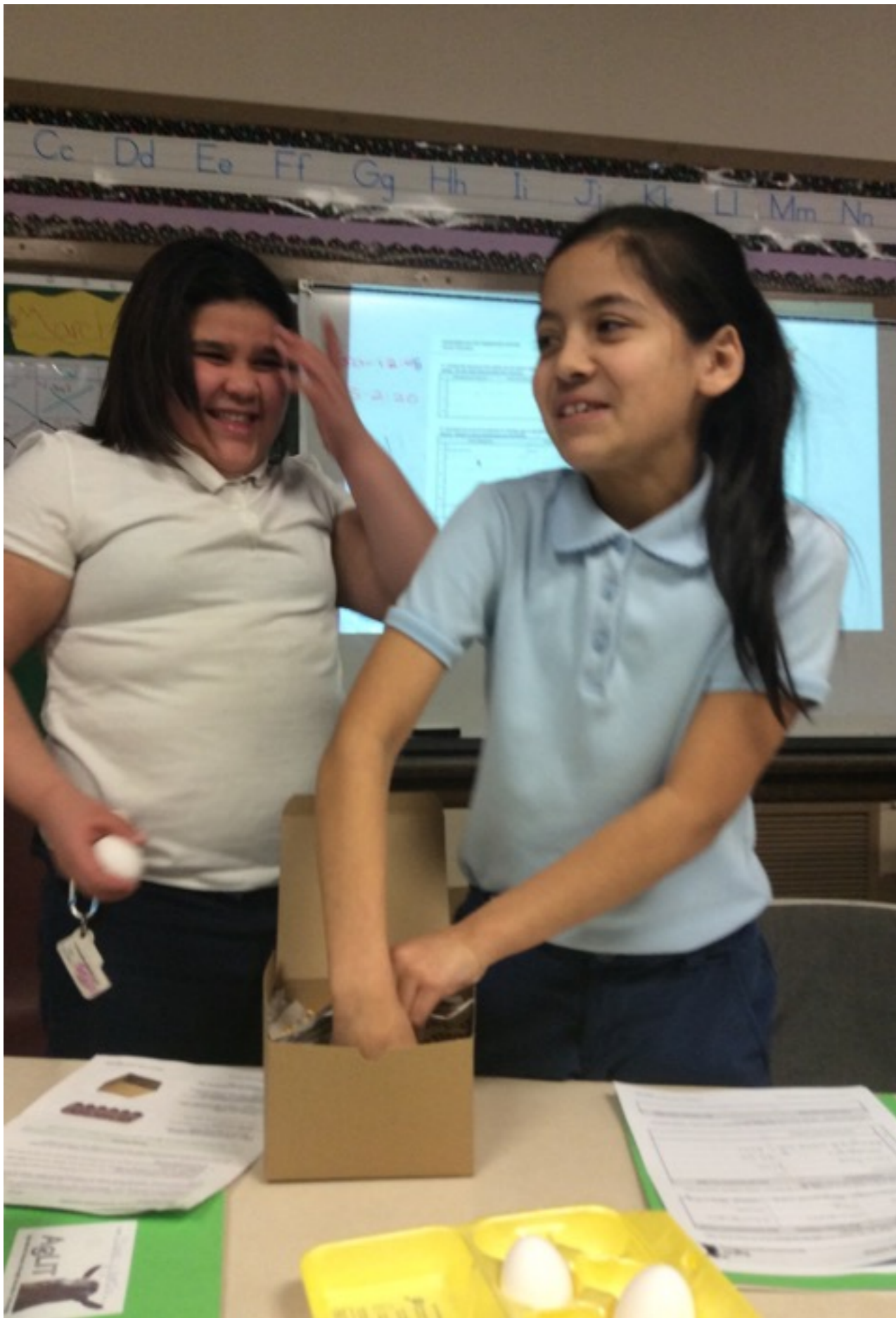












This was a demo for the district







# PRODUCING A SUSTAINABLE MARKETING PLAN

## *Instruction Sheet*



Throughout the unit, you and your team have been preparing the farm's products for sale at the farmers' market, and now you're ready to make your marketing plan and farm stand! Marketing plans are written ideas created to give your business direction for selling its products. How will you describe your business? What will you sell? And how will you get people to buy products from you?

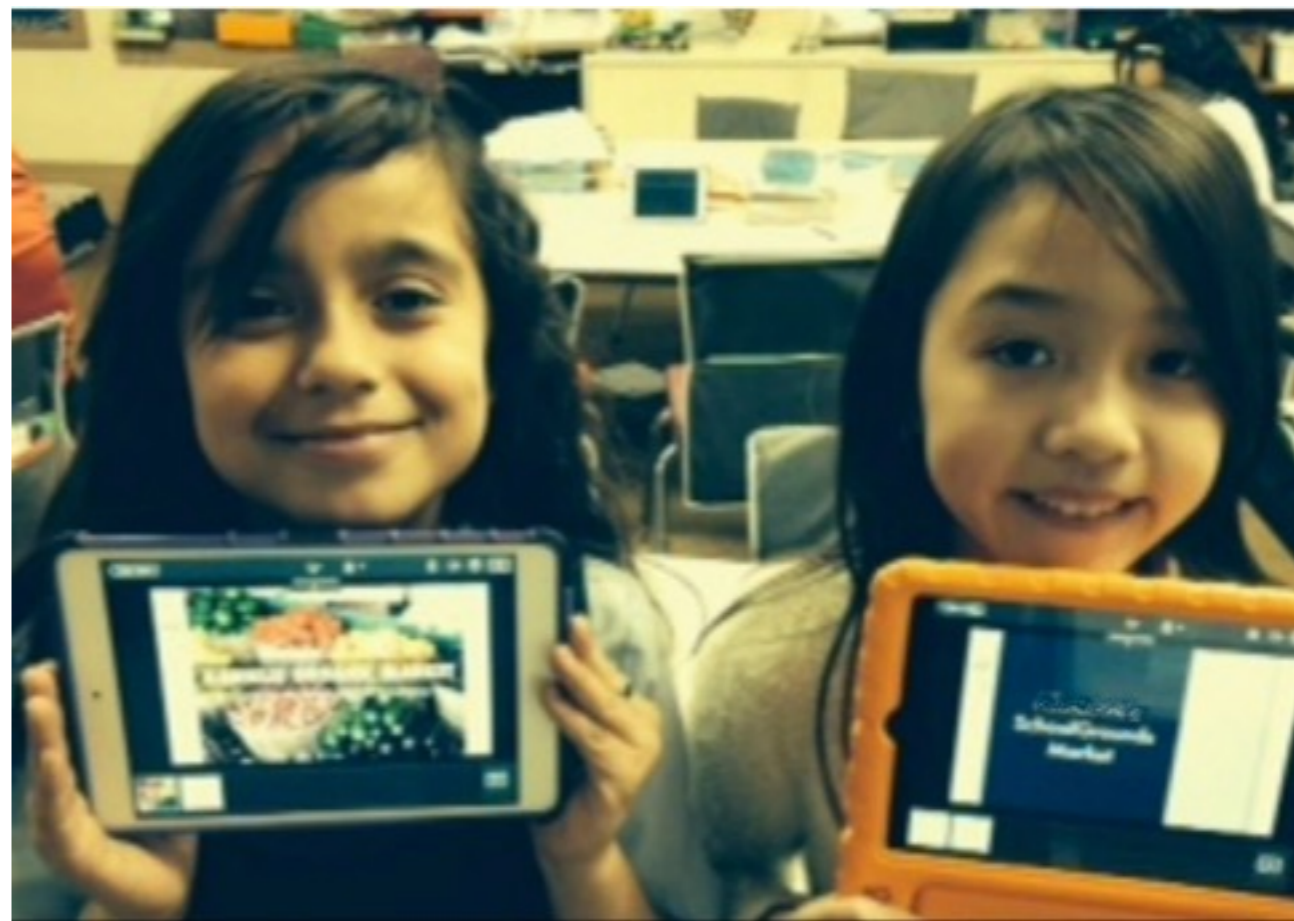
There are two parts to developing your plan. First, you will analyze the market, decide what products you will sell, and determine the price you should set to sell each of your products. You will also create your virtual brochure! The second part of your plan will include an analysis of your business's goals, strengths, and weaknesses. It is here that you will think about your advertising strategy and design your farm stand.

You will spend the next two days developing your marketing plans with your team. When you are finished, you will have to present your final marketing plans to the farmer!

### **Driving Question**

How will your new business sustainably sell its products at the farmers' market?













# FARM TOUR





# MAP OF FARM





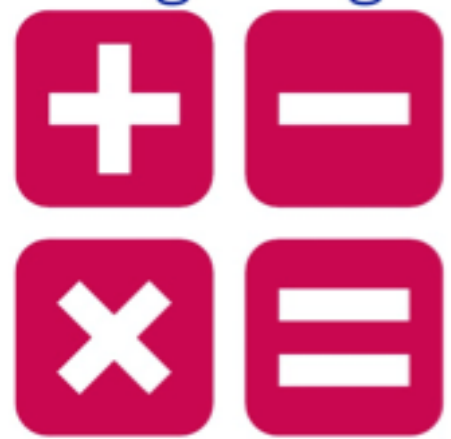
science



technology



engineering



mathematics







## Quests

Active Quests

Completed Quests

### Go to the Greenhouse

Pass the iPad to the Agricultural Scientist.







Only 2  
refused!







**WHAT I LEARNED...**



Kids love  
selfies!  
A lot.





CHECK YOUR UNIFORM, Please  
As soon as the lesson can  
Remember to turn up for the bell!



### Our Focus Wall

Reading Time

Essential Question

Learning Objectives

Resources

Activities

Assessment

### OBJECTIVES

1. To understand the importance of organic food.

2. To identify different types of organic produce.

3. To discuss the benefits of organic food.

### HOMEWORK

### RESPONSIBILITIES

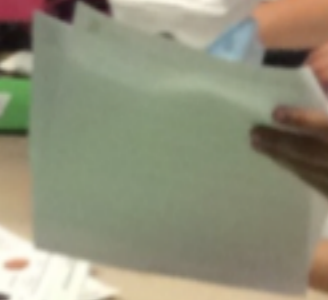
Task	Responsible
Task 1	Responsible 1
Task 2	Responsible 2
Task 3	Responsible 3
Task 4	Responsible 4
Task 5	Responsible 5
Task 6	Responsible 6
Task 7	Responsible 7
Task 8	Responsible 8
Task 9	Responsible 9
Task 10	Responsible 10

### SCHEDULE

Time	Activity
9:00 - 9:30	Lesson 1
9:30 - 10:00	Lesson 2
10:00 - 10:30	Lesson 3
10:30 - 11:00	Lesson 4
11:00 - 11:30	Lesson 5
11:30 - 12:00	Lesson 6
12:00 - 12:30	Lesson 7
12:30 - 1:00	Lesson 8
1:00 - 1:30	Lesson 9
1:30 - 2:00	Lesson 10











*Thank you for giveing me and my class wonderful agriculture lessons! My favorite lesson that I did with you is the one where we got to make our very own farmers market and also got to make the little online book thingy. Thank you for helping me learn about agriculture.*

*P.S. all of the lessons you gave me were the most funnest time of my life!*



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Please  
ignore  
spelling



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**Conference Access Code:**

**NAITC2016**



notes



notes



notes



notes