GIFTED & TALENTED INDEPENDENT STUDY

From Seed to Sale: The Business and Science of Modern Agriculture

Student: **Grade:** 5-6 **Length:** 3-Week Sprint

ESSENTIAL QUESTION (DOK 4)

How do farmers use science and economics together to grow enough food to feed people while still making a living?

Your Challenge (Problem-Based Learning Scenario)

You've just inherited 100 acres of farmland from a relative. Before you plant anything, you need to become an expert in both the science and the business of farming — because a great crop nobody can afford to buy is a failed farm. Your job is to design a one-season farm plan that is both scientifically sound and profitable.

Depth & Complexity Lenses to Apply Throughout

Depth & Complexity Lens	Guiding Prompt to Keep Asking Yourself
Rules	What economic 'rules' — like supply and demand — determine what price a farmer can sell a crop for?
Trends	How have crop prices or farming methods changed over the past 20-50 years, and why?
Big Idea	Are science and economics interdependent in agriculture — can you have one without the other?
Details	What specific details — soil type, water, pests, season — affect whether a crop succeeds?
Over Time	How has farming technology changed the relationship between supply and demand?
Ethics	When is it fair for a farmer to raise prices, and when does it hurt the community?

Guiding Investigation Questions (DOK 3-4 / Upper Bloom's)

Supply and Demand

- Analyze a real crop's price history and explain how a shortage or surplus affected its price. *[Analyze, DOK 3]*
- Evaluate what should happen to a farm's plan if demand for its crop suddenly dropped by half — what should the farmer do, and why? *[Evaluate, DOK 4]*

The Business and Math of Farming

- Analyze the costs involved in growing one acre of a chosen crop (seed, water, equipment, labor) and calculate a break-even price. *[Analyze, DOK 3]*
- Design a one-season budget for your farm that accounts for costs, projected yield, and a target profit margin. *[Create, DOK 4]*

The Science Behind Farming

- Analyze how soil, water, and climate requirements differ between two crops of your choice. *[Analyze, DOK 3]*

- Evaluate which farming method — traditional, organic, or high-tech/precision — would be most profitable AND sustainable for your land. Defend your choice with evidence. *[Evaluate, DOK 4]*

Research Menu — Choose at Least 3 Ways to Investigate

- Interview a farmer, gardener, or agriculture teacher about how they decide what to plant.
- Track a chosen crop's real market price for 2 weeks and graph the changes.
- Research the soil, water, and climate needs of 3 different crops and compare them in a chart.
- Investigate one farming technology (drones, irrigation systems, GMOs) and explain how it affects supply and profit.
- Calculate the full cost-to-profit breakdown for growing a crop of your choice on a 1-acre plot.

Show What You Know — Product Choice Board

- Business plan document with a budget spreadsheet or table
- Poster board illustrating your farm plan, costs, and profit projections
- Slideshow 'pitch' to investors explaining why your farm will succeed
- Comic strip or storyboard following a crop from seed to sale

Along the way, use at least one product option to show progress at each weekly checkpoint (see timeline below).

Study Timeline

Week	Focus	Checkpoint (Show Your Progress)
Week 1	Research the science of farming for 2-3 crops.	Comparison chart of crop needs
Week 2	Study supply and demand and calculate costs.	Cost breakdown + supply/demand graph
Week 3	Build and present your farm business plan.	Final business plan/pitch delivered

Final Project

Create a complete Farm Business Plan for your 100-acre inheritance: choose your crop(s), justify them scientifically, build a cost/profit budget, and explain how supply and demand will affect your pricing strategy. Pitch your plan as if asking a bank for a loan.

Audience:

Teacher, classmates, or a 'panel' of family/community members acting as investors.

Success Criteria:

- Includes accurate math (costs, revenue, profit margin)
- Explains at least one scientific factor affecting crop success
- Explains how supply and demand influences your pricing decision
- Plan is realistic, organized, and persuasively presented

Reflection Journal Prompts

- Which was harder to plan for — the science side or the money side of farming? Why?
- What would you do differently if demand for your crop dropped unexpectedly?
- How has this study changed how you think about the food you eat?