

# Advanced Crop Science

## Instructional Framework

An instructional framework provides educators with a list of benchmark statements aligned to Common Core and national content area standards for a given course or program. The Missouri Advanced Crop Science Instructional Framework lists a sequence of content, organized into distinct units of instruction. Sample activities and potential Common Core related enhancements are provided.

	Common Core Standards	National Standards (AFNR)	Activities	Enhancements
<b>A. Overview</b>				
1. Missouri Crops and Their Uses	R1.11-12.1 RST.11-12.7 RST.11-12.8 RST.11-12.9 SL.11-12.4 SL.11-12.6 WHST.11-12.1.a-b WHST.11-12.1.e SL.11-12.4 SL.11-12.6 RST.11-12.4		1. Research the different crops grown in Missouri and present them orally to the class. 2. Challenge students to develop a new food product from the crops grown in Missouri and create a poster presentation. 3. Create flash cards of the different crops grown in Missouri.	
2. The Importance of Crops	S-ID.1		1. Research and conduct a scavenger hunt for current events and create a graph of comparing numbers of	

			bushels of crops grown in Missouri.	
3. Careers in Crop Science	SL.11-12.6 RI.11-12.7 RST.11-12.7 RST.11-12.8 RST.11-12.9 WHST.11-12.4 WHST.11-12.7 WHST.11-12.9		1. Interview an individual in the crop science industry. 2. Research a career in the crop science industry.	
4. Government Influence and Current Trends	RST.11-12.1 WHST.11-12.1.a-e WHST.11-12.9		1. Complete a case study covering the governmental influence on the crop science industry. 2. Complete a case study covering the current trends in the crop science industry.	
<b>B. Plant Biology</b>				
1. Plant Physiology	WHST.11-12.10 RI.11-12.7 RST.11-12.7 RST.11-12.8 RST.11-12.9 WHST.11-12.4 WHST.11-12.7 WHST.11-12.9		1. Germinate seeds of monocot and dicot plants. Record daily observations in a journal. 2. Plant different varieties of seeds within a species and complete a research report with your findings.	
2. Plant Growth and Nutrient Needs	RST.11-12.1 WHST.11-12.1.a-e WHST.11-12.9 SL.11-12.4 SL.11-12.6		1. Complete a case study on recent findings in regards to nutrients valuable for plant growth. 2. Interview a soil	

	WHST.11-12.2.a-b WHST.11-12.2.e		scientist. Present your findings to the class.	
<b>C. Soil Fertility and Management</b>				
1. Soil Composition	SL.11-12.2 SL.11-12.6		1. Provide four soil samples for the students to judge. Have them analyze the soil particles of each sample.	
2. Soil Types and Limitations	WHST.11-12.1.a-e WHST.11-12.2.a-e WHST.11-12.7 SL.11-12.6		1. Have the students use soil sample books to determine the soil in a particular area. Have them prepare written reasons why they feel the selected area would have good or poorly draining soils. 2. Have students interview a land owner which has recently completed conservation practices on their land.	
3. Soil Testing	SL.11-12.2 SL.11-12.6 RI.11-12.7 RST.11-12.7 RST.11-12.8 RST.11-12.9 WHST.11-12.4 WHST.11-12.7 WHST.11-12.9		1. Organize a soils judging career development event team with students in the class. 2. Have students complete a research report which is analyzing results from soil sampling.	

4. Fertilizing Soils	SL.11-12.5 SL.11-12.6 WHST.11-12.2.a-b WHST.11-12.2.e N-Q.1		1. Create a media presentation explaining fertilizer application methods. 2. Calculate fertilizer needs and application rates of selected fields.	
5. Soil Management Practices	SL.11-12.4 SL.11-12.6 SL.11-12.1.c-d SL.11-12.6		1. Prepare a poster presentation explaining the different tillage practices. 2. Prepare a poster presentation explaining the different planting methods. 3. Conduct a debate on conventional- versus conservation-tilled soils.	
6. Soil Conservation Practices	SL.11-12.6 RST.11-12.1 WHST.11-12.11.a-e WHST.11-12.9		1. Have students conduct interviews with individuals who practice soil conservation. 2. Analyze case studies over the different soil conservation practices.	
<b>D. Identifying and Selecting Crops and Seeds</b>				
1. Crop and Weed Identification	SL.11-12.4 SL.11-12.6 RI.11-12.7 RST.11-12.7		1. Create a poster presentation over legumes, forbs, or woody plants.	

	RST.11-12.8 RST.11-12.9 WHST.11-12.4 WHST.11-12.7 WHST.11-12.9		2. Prepare a research report over the weeds in their area.	
2. Crop Selection	SL.11-12.4 SL.11-12.6 WHST.11-12.2.a-b WHST.11-12.2.e		1. Conduct an interview with a seed salesperson and prepare a presentation for the class.	
3. Crop Seed Selection	WHST.11-12.1.a-e WHST.11-12.2.a-e WHST.11-12.7 SL.11-12.2 SL.11-12.6		1. Have students research various seed companies and prepare written reasons for seed selected. 2. Develop seed judging activities for the students.	
<b>E. Safety, Environment, and Legal Issues</b>				
1. Protecting Ourselves and Others	WHST.11-12.6 SL.11-12.4 SL.11-12.6		1. Have students create an online social media presentation about safety around the farm. 2. Create a poster about safety and present to an elementary class.	
2. Protecting the environment	SL.11-12.1.c-d SL.11-12.6 RI.11-12.7 RST.11-12.7 RST.11-12.8 RST.11-12.9		1. Conduct a debate on the biggest problem or danger of crop production activities. 2. Have students research the different	

	WHST.11-12.4 WHST.11-12.7 WHST.11-12.9		conservation practices supported by the Natural Resource and Conservation Services.	
3. Knowing the law	N-Q.1		1. Calculate legal land descriptions.	
<b>F. Corn and Grain Sorghum Production</b>				
1. Planning the Crop	RST.11-12.4 RI.11-12.7 RST.11-12.7 RST.11-12.8 RST.11-12.9 WHST.11-12.4 WHST.11-12.7 WHST.11-12.9		1. Create flash cards of nutrient deficiencies. 2. Conduct an experiment and write a research report on the effects of light or temperature on plants.	
2. Selecting a Variety	RST.11-12.4		1. Create flash cards of nutrient deficiencies.	
3. Selecting a Tillage and Planting Method	SL.11-12.1.c-d SL.11-12.6 WHST.11-12.6 N-Q.1		1. Conduct a debate on the different tillage methods. 2. Create an online database for the state to compare planting and harvest dates. 3. Calculate corn populations and costs of planting.	
4. Selecting a Pest Control Program	RST.11-12.4 SL.11-12.6		1. Create flash cards of common pests. 2. Interview crop scouts on common pests in the area.	

5. Scouting and Maintaining the Crops	RST.11-12.4 SL.11-12.6 N-Q.1		1. Create flash cards of common weeds. 2. Interview crop scouts on common pests in the area. 3. Calculate the costs of replanting lost crops.	
6. Harvesting the Crop	N-Q.1 SL.11-12.5 SL.11-12.6 WHST.11-12.2.a-b WHST.11-12.2.e		1. Calculate the proper harvest times. 2. Calculate harvest losses. 3. Create a media presentation of the different harvest methods.	
7. Marketing the Crop	N-Q.1 WHST.11-12.10		1. Using a specified commodity play the futures market. 2. Set up an imaginary farm and fill out a journal along the way.	
8. Figuring Crop Costs	N-Q.1		1. Calculate variable and fixed costs and net returns.	
<b>G. Soybean Production</b>				
1. Planning the Crop	RST.11-12.4 RI.11-12.7 RST.11-12.7 RST.11-12.8 RST.11-12.9 WHST.11-12.4 WHST.11-12.7 WHST.11-12.9		1. Create flash cards of nutrient deficiencies. 2. Conduct an experiment and write a research report on the effects of light or temperature on plants.	

2. Selecting a Variety	RST.11-12.4		1. Create flash cards of nutrient deficiencies.	
3. Selecting a Tillage and Planting Method	SL.11-12.1.c-d SL.11-12.6 WHST.11-12.6 N-Q.1		1. Conduct a debate on the different tillage methods. 2. Create an online database for the state to compare planting and harvest dates. 3. Calculate corn populations and costs of planting.	
4. Selecting a Weed Control Program	RST.11-12.4 SL.11-12.6		1. Create flash cards of common weeds. 2. Interview crop scouts on common pests in the area.	
5. Scouting and Maintaining the Crops	RST.11-12.4 SL.11-12.6 N-Q.1		1. Create flash cards of common weeds. 2. Interview crop scouts on common pests in the area. 3. Calculate the costs of replanting lost crops.	
6. Harvesting the Crop	N-Q.1 SL.11-12.5 SL.11-12.6 WHST.11-12.2.a-b WHST.11-12.2.e		1. Calculate the proper harvest times. 2. Calculate harvest losses. 3. Create a media presentation of the different harvest methods.	
7. Marketing the Crop	N-Q.1		1. Using a specified	



	WHST.11-12.10		commodity play the futures market. 2. Set up an imaginary farm and fill out a journal along the way.	
8. Figuring Crop Costs	N-Q.1		1. Calculate variable and fixed costs and net returns.	
<b>H. Wheat and Small Grain Production</b>				
1. Planning the Crop	RST.11-12.4 RI.11-12.7 RST.11-12.7 RST.11-12.8 RST.11-12.9 WHST.11-12.4 WHST.11-12.7 WHST.11-12.9		1. Create flash cards of nutrient deficiencies. 2. Conduct an experiment and write a research report on the effects of light or temperature on plants.	
2. Selection of Variety	RST.11-12.4		1. Create flash cards of nutrient deficiencies.	
3. Selecting a Tillage and Planting Method	SL.11-12.1.c-d SL.11-12.6 WHST.11-12.6 N-Q.1		1. Conduct a debate on the different tillage methods. 2. Create an online database for the state to compare planting and harvest dates. 3. Calculate corn populations and costs of planting.	
4. Pest Control Program	RST.11-12.4 SL.11-12.6		1. Create flash cards of common pests. 2. Interview crop scouts	

			on common pests in the area.	
5. Scouting and Maintaining the Crop	RST.11-12.4 SL.11-12.6 N-Q.1		1. Create flash cards of common weeds. 2. Interview crop scouts on common pests in the area. 3. Calculate the costs of replanting lost crops.	
6. Harvesting the Crop	N-Q.1 SL.11-12.5 SL.11-12.6 WHST.11-12.2.a-b WHST.11-12.2.e		1. Calculate the proper harvest times. 2. Calculate harvest losses. 3. Create a media presentation of the different harvest methods.	
7. Marketing the Crop	N-Q.1 WHST.11-12.10		1. Using a specified commodity play the futures market. 2. Set up an imaginary farm and fill out a journal along the way.	
8. Figuring Crop Costs	N-Q.1		1. Calculate variable and fixed costs and net returns.	
<b>I. Forage Production</b>				
1. Planning the Crop	RST.11-12.1 WHST.11-12.a-e WHST.11-12.9 SL.11-12.6		1. Complete a case study covering forage production. 2. Interview a local producer.	
2. Selecting a Forage	RST.11-12.4 RI.11-12.7		1. Create flash cards of the different types of	

	RST.11-12.7 RST.11-12.8 RST.11-12.9 SL.11-12.4 SL.11-12.6 WHST.11-12.1.a-b WHST.11-12.1.e		forages. 2. Research and report on forage grown in the area.	
3. Selecting a Tillage and Planting Method	RI.11-12.7 RST.11-12.7 RST.11-12.8 RST.11-12.9 WHST.11-12.4 WHST.11-12.7 WHST.11-12.9 SL.11-12.2 SL.11-12.6		1. Research the different types of equipment to plant a forage stand. 2. Examine soil sample of well and non-well established forage stands.	
4. Scouting and Maintaining the Crop	RST.11-12.4 SL.11-12.5 SL.11-12.6 WHST.11-12.2.a-b WHST.11-12.2.e		1. Create flash cards of the different types of pests. 2. Create a PowerPoint presentation of the different methods to control pests.	
5. Selecting a Grazing System	WHST.11-12.1.a-e WHST.11-12.2.a-e WHST.11-12.7 N-Q.1		1. Provide written reasons why you would choose the different grazing systems. 2. Practice calculating Carrying capacity and “cow-days.”	
6. Harvesting for Seed	SL.11-12.4 SL.11-12.6		1. Create a poster of five different forage crops used for their seeds and present to the class.	

7. Harvesting for Feed	WHST.11-12.10		1. Record in a journal the analysis of several hay samples.	
8. Marketing the Crop and Figuring Crop Costs	N-Q.1		1. Calculate crop costs.	
<b>J. Cotton Production</b>				
1. Planning the Crop	N.Q-1 WHST.11-12.1.a-e WHST.11-12.2.a-e WHST.11-12.7		1. Calculate and chart rain fall over a period of time. 2. Conduct and analyze soil samples. Provide written results.	
2. Selecting the Variety	SL.11-12.4 SL.11-12.6 WHST.11-12.2.a-b WHST.11-12.2.e		1. Have students research various seed companies and prepare written reasons. 2. Develop seed judging activities for the students.	
3. Tilling and Planting the Crop	SL.11-12.1.c-d SL.11-12.6 WHST.11-12.6		1. Conduct a debate on the different tillage methods. 2. Create an online database for the state to compare planting and harvest dates.	
4. Selecting a Weed Control Program	RST.11-12.4 SL.11-12.6		1. Create flash cards of common weeds. 2. Interview crop scouts on common pests in the area.	

5. Scouting and Maintaining the Crop	RST.11-12.4 SL.11-12.5 SL.11-12.6 WHST.11-12.2.a-b WHST.11-12.2.e		1. Create flash cards of the different types of pests. 2. Create a PowerPoint presentation of the different methods to control pests.	
6. Harvesting the Crop	N-Q.1 SL.11-12.5 SL.11-12.6 WHST.11-12.2.a-b WHST.11-12.2.e		1. Calculate the proper harvest times. 2. Calculate harvest losses. 3. Create a media presentation of the different harvest methods.	
7. Marketing the Crop	N-Q.1 WHST.11-12.10		1. Using a specified commodity play the futures market. 2. Set up an imaginary farm and fill out a journal along the way	
8. Figuring Crop Costs	N-Q.1		1. Calculate variable and fixed costs and net returns.	
<b>K. Rice Production</b>				
1. Planning the Crop	N.Q-1 WHST.11-12.1.a-e WHST.11-12.2.a-e WHST.11-12.7		1. Calculate and chart rain fall over a period of time. 2. Conduct and analyze soil samples. Provide written results.	
2. Selecting a Variety	SL.11-12.4 SL.11-12.6		1. Have students research various seed companies	

	WHST.11-12.2.a-b WHST.11-12.2.e		and prepare written reasons. 2. Develop seed judging activities for the students.	
3. Tilling and Planting the Crop	SL.11-12.1.c-d SL.11-12.6 WHST.11-12.6		1. Conduct a debate on the different tillage methods. 2. Create an online database for the state to compare planting and harvest dates.	
4. Scouting and Maintaining the Crop	RST.11-12.4 SL.11-12.5 SL.11-12.6 WHST.11-12.2.a-b WHST.11-12.2.e		1. Create flash cards of the different types of pests. 2. Create a PowerPoint presentation of the different methods to control pests.	
5. Harvesting the Crop	N-Q.1 SL.11-12.5 SL.11-12.6 WHST.11-12.2.a-b WHST.11-12.2.e		1. Calculate the proper harvest times. 2. Calculate harvest losses. 3. Create a media presentation of the different harvest methods.	
6. Marketing the Crop	N-Q.1		1. Calculate variable and fixed costs and net returns.	

**Codes for Common Core Mathematics are:**

- N = Number and Quantity
- A = Algebra
- F = Functions
- G = Geometry
- S = Statistics and Probability

**Codes for Common Core English Language Arts and Literacy are:**

- RL = Reading for Literature
- RI = Reading for Informational Text
- RST = Reading for Literacy in Science and Technical Subjects
- RH = Reading for Literacy in History/Social Studies
- W = Writing
- WHST = Writing for Literacy in History/Social Studies, Science, and Technical Subjects
- SL = Speaking and Listening
- L = Language