

In this lesson, students will learn about North Dakota agriculture by looking at maps and charts that contain information critical to successful plant growth. Students will be assigned a county in the state. Then they will draw a card for one crop. The students will need to analyze the information on the cards and maps to determine whether it is a crop they could grow.

## Supplies

- Crop cards
- Electronic or print copies of the maps supplied, one set per student group
- Student worksheet

## Setup

Students should already have studied agriculture in the state and be familiar with the basics of agriculture. ND Studies offers relevant information for your students.

Print out the precipitation, landform, temperature, and soil pH maps, and growing season chart; one copy of each per student group.

Print and cut out the crop cards.

## Objectives

- Students will understand that crops have specific requirements like rain, soil, and time to grow.
- Students will learn how to read different maps and charts.
- Students will understand that North Dakota has different soil types, regions, precipitation levels, and a varied climate that impacts what farmers plant in different areas of the state.

## Background

Many immigrants to Dakota Territory were drawn to the prairie by the Homestead Act of 1862, which allowed people to own a quarter section of land as long as they improved it. Native Americans had lived on the land for thousands of years, but recent wars had pushed many of the tribes such as the Lakotas further west, while other groups like the Yanktonais were already living on reservations by

1867. In 1868, the first land claim was filed in the northeastern part of Dakota Territory near Pembina. European-Americans also obtained land through the Timber Culture Act and by purchasing it from railroad companies. Many people came here to obtain land to grow crops or raise livestock.

Today, agriculture makes up 25% of North Dakota's economy, making it the largest sector of the economy. North Dakota produces many different agricultural products and leads the nation in the production of several crops such as dry edible beans, wheat, honey, canola, flaxseed, oats, and dry edible peas. North Dakotans also raise livestock and poultry including cows, sheep, pigs, bison, chickens, and turkeys for their byproducts and meat. These agricultural products are processed into the food we eat. It is important for farmers to know about the climate, soil types, and needs of their crops to make an informed decision about what to plant each season. Today, the extension office in each county can help farmers with this. Before the extension office, farmers needed to make these decisions based on the knowledge they could gather from sources like maps, reports, and even word of mouth.

## Activity

- Go over various map reading skills so the students understand the maps they will be analyzing. This should include different types of maps, different symbols on a map, legends, etc.
- Put students into small groups of two to three people.
- Make sure each group has the maps and charts or access to them.

- Assign the student groups a county in North Dakota. These can be assigned by you, drawn from a hat, or selected by an online randomizer.
- Have each group choose one crop from the five crop cards.
- Have each group analyze their selected crop and land to determine if the land would produce a successful crop for a summer.
- Lead a discussion as to what the students found and why they did or did not choose to plant the crop in that area.

## **Extension**

Have students create a map indicating all the places in the state where a certain crop could grow.

Have students use multiple crop cards and determine which, if any, would be best to grow in their county.

Have students investigate a new crop that could be grown in North Dakota and make a brochure promoting its production in the state. (Lentils are pretty new to the state, for example.)

## **Reflection questions**

Do you think you would try to plant a crop that meets most of the criteria, but not all of them, in hopes that the crop turns out? What might impact your decision?



**Wheat**



**Sugar Beets**



**Canola**



**Soybeans**



**Corn**

***Wheat needs the following to grow well:***

Soil type: well-drained soil;  
pH 5.5-8

Precipitation: 12-15 inches

Average temperature:  
70-75 degrees

Growing season: 100-130 days

***Beets need the following to grow well:***

Soil type: nutrient rich soil

Precipitation: 16-plus inches

Average temperature:  
70-80 degrees

Growing season: 90-95 days

***Canola needs the following to grow well:***

Soil type: medium, well-drained soil,  
pH 6-7

Precipitation: 17-28 inches

Average temperature:  
above 50 degrees

Growing season: 100 days

***Soybeans need the following to grow well:***

Soil type: well-drained soil,  
pH 6-6.8

Precipitation: 16-18 inches

Average temperature:  
65-77 degrees

Growing season: 100-plus days

***Corn needs the following to grow well:***

Soil type: Most soil types

Average temperature:  
75-85-plus degrees

Precipitation: 15-plus inches

Growing season: 130-plus days

**Names:** \_\_\_\_\_

**Section 1:** Use the maps to collect information about your county and fill out the table.

County: \_\_\_\_\_

Two cities in the county: \_\_\_\_\_

Soil condition: \_\_\_\_\_

Average temperature: \_\_\_\_\_

Average precipitation: \_\_\_\_\_

Average growing season: \_\_\_\_\_

**Section 2:** Use the crop card and compare your crop needs to what your county has. For each condition, place a check mark if it is bad, okay, or good for your crop.

### Crop 1

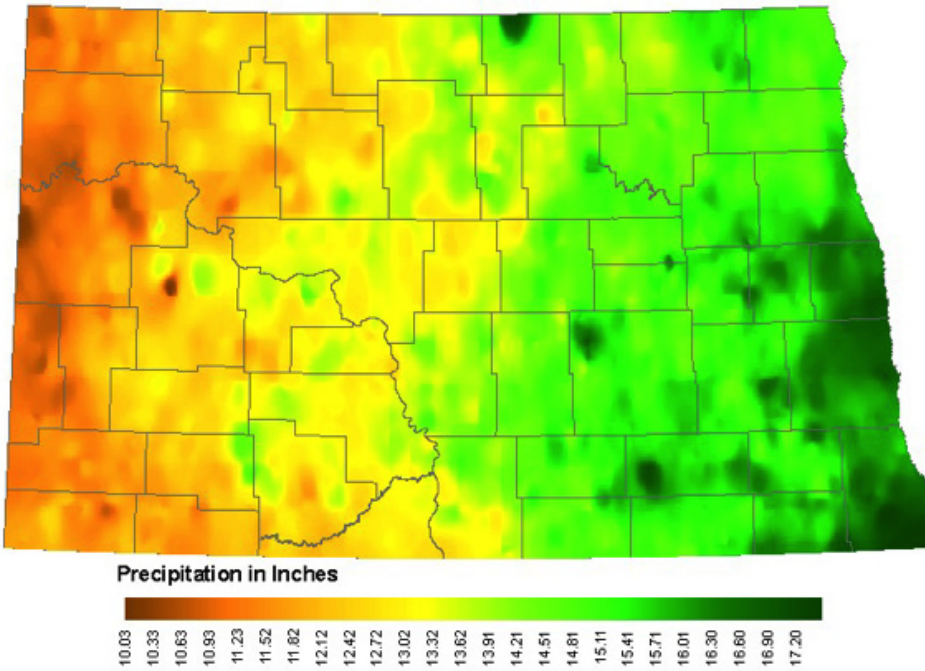
Condition	Bad	Okay	Good	Would you plant this crop in your county? Why or Why not?
Soil				
Precipitation				
Temperature				
Growing Season				

### Crop 2

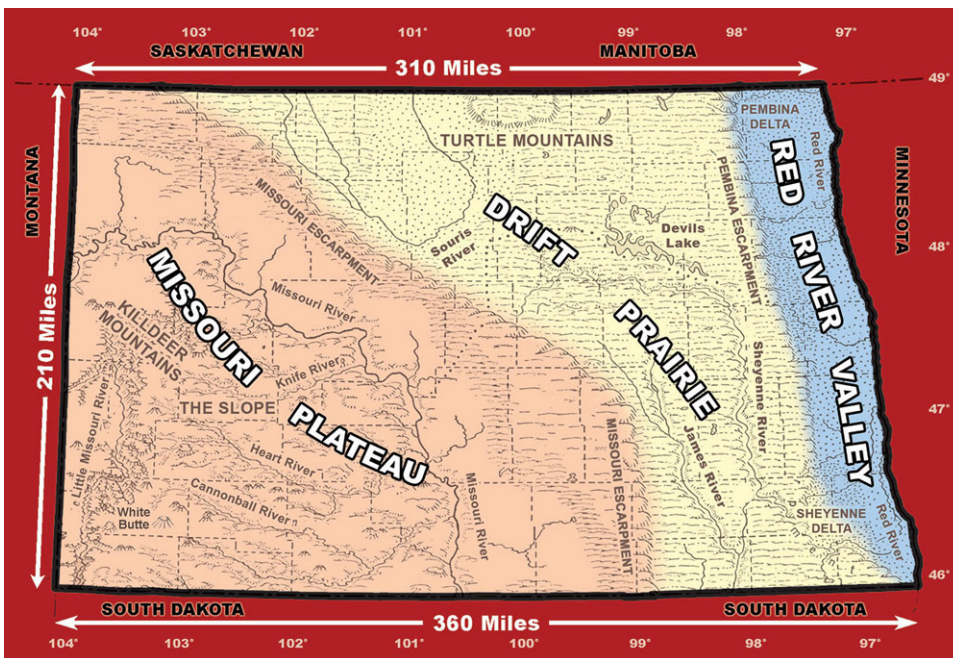
Condition	Bad	Okay	Good	Would you plant this crop in your county? Why or Why not?
Soil				
Precipitation				
Temperature				
Growing Season				

### Crop 3

Condition	Bad	Okay	Good	Would you plant this crop in your county? Why or Why not?
Soil				
Precipitation				
Temperature				
Growing Season				

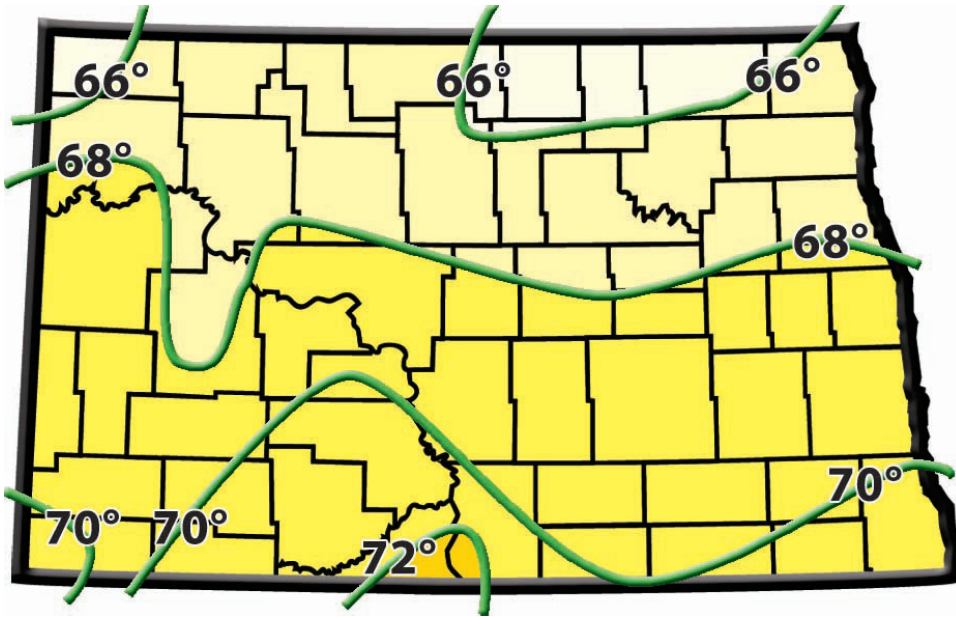


**30-year seasonal average rainfall for the state of North Dakota, 1977-2006.**  
(ND Department of Water Resources)

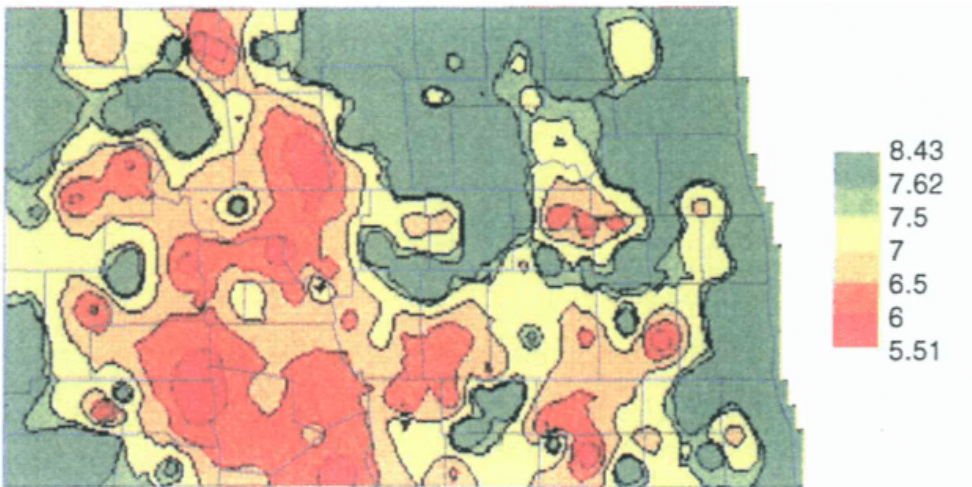


**Landforms of North Dakota**  
(ndstudies.gov)

North Dakota has three distinct regions based on geography and soil. The Red River Valley is flat with good, nutrient-rich soil and little drainage. The Drift Prairie is characterized by small ponds, hills, and rocky, well-drained soil. The Missouri Plateau is the highest land in North Dakota. The Missouri River, White Butte (the highest point in the state), and the Badlands are located within the Missouri Plateau. Map by Cassie Theurer









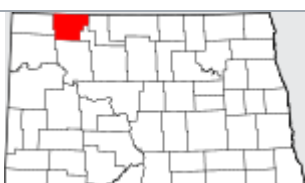
Average July Temperatures  
(ndstudies.gov)





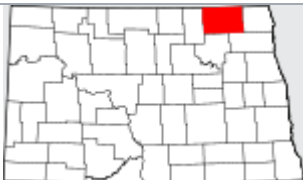
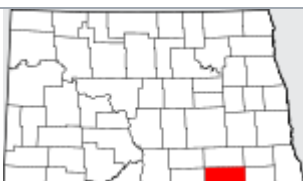

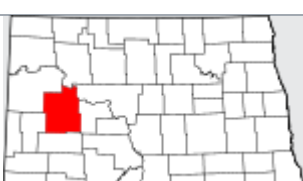


GIS Hub Explorer (nd.gov)





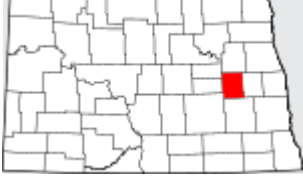
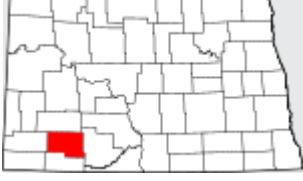
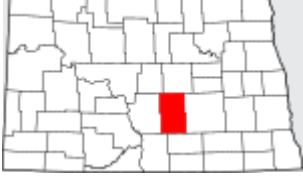
Soil pH on sloping positions on non-manured sites, 1998.



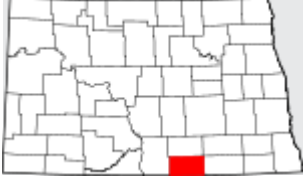

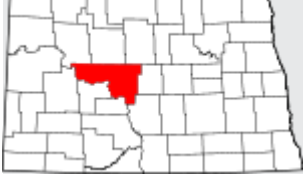
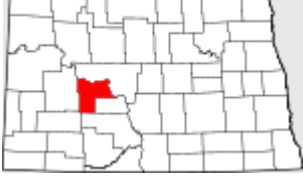
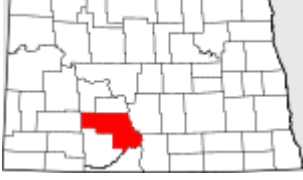
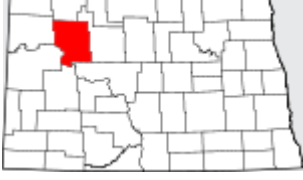
For growing seasons, check the first and last frost dates here ([almanac.com/gardening/frostdates/ND](http://almanac.com/gardening/frostdates/ND))




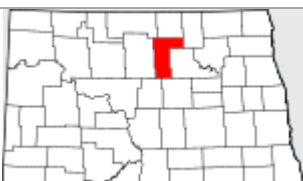


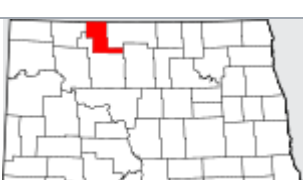

County	County Seat	Growing season (in days)	Map of County
<b>Adams County</b>	Hettinger	110	
<b>Barnes County</b>	Valley City	125	
<b>Benson County</b>	Minnewaukan	142	
<b>Billings County</b>	Medora	113	
<b>Bottineau County</b>	Bottineau	122	
<b>Bowman County</b>	Bowman	121	
<b>Burke County</b>	Bowbells	119	






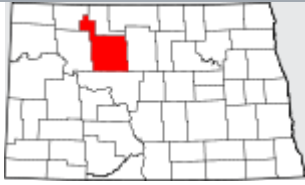


<b>Burleigh County</b>	Bismarck	133	
<b>Cass County</b>	Fargo	139	
<b>Cavalier County</b>	Langdon	120	
<b>Dickey County</b>	Ellendale	140	
<b>Divide County</b>	Crosby	119	
<b>Dunn County</b>	Manning	113	
<b>Eddy County</b>	New Rockford	127	
<b>Emmons County</b>	Linton	128	

<b>Foster County</b>	Carrington	130	
<b>Golden Valley County</b>	Beach	121	
<b>Grand Forks County</b>	Grand Forks	132	
<b>Grant County</b>	Carson	126	
<b>Griggs County</b>	Cooperstown	116	
<b>Hettinger County</b>	Mott	119	
<b>Kidder County</b>	Steele	122	
<b>LaMoure County</b>	LaMoure	131	

<b>Logan County</b>	Napoleon	127	
<b>McHenry County</b>	Towner	116	
<b>McIntosh County</b>	Ashley	127	
<b>McKenzie County</b>	Watford City	130	
<b>McLean County</b>	Washburn	130	
<b>Mercer County</b>	Stanton	110	
<b>Morton County</b>	Mandan	127	
<b>Mountrail County</b>	Stanley	119	

<b>Nelson County</b>	Lakota	128	
<b>Oliver County</b>	Center	128	
<b>Pembina County</b>	Cavalier	130	
<b>Pierce County</b>	Rugby	117	
<b>Ramsey County</b>	Devils Lake	142	
<b>Ransom County</b>	Lisbon	127	
<b>Renville County</b>	Mohall	118	
<b>Richland County</b>	Wahpeton	140	

<b>Rolette County</b>	Rolla	118	
<b>Sargent County</b>	Forman	136	
<b>Sheridan County</b>	McClusky	125	
<b>Sioux County</b>	Fort Yates	128	
<b>Slope County</b>	Amidon	120	
<b>Stark County</b>	Dickinson	113	
<b>Steele County</b>	Finley	117	
<b>Stutsman County</b>	Jamestown	134	

<b>Towner County</b>	Cando	124	
<b>Trail County</b>	Hillsboro	147	
<b>Walsh County</b>	Grafton	144	
<b>Ward County</b>	Minot	134	
<b>Wells County</b>	Fessenden	127	
<b>Williams County</b>	Williston	123	

\*Number of days is based on 2023 data; it can vary 5-10 days year to year.