



Crop Science Investigation Workshop Series Lesson Plans

Subject: Crop Production- Planting

Grade Level(s): 4th – 12th grades

Lesson Title: What are factors should be considered when planting corn or soybeans?

Time period: 2, 2 hour sessions (depending on activities conducted)

This lesson can easily be adapted to address as few as one learning objective or all. Objectives and corresponding learning activities are numbered accordingly.

These lessons can be adapted for youth of any age depending on level of technical content taught.

When working with youth of varying ages, it is suggested to have older youth help the younger ones.

Lesson Objectives:

1. Examine selection criteria for planting hybrids.
2. Determine factors that affect planting in different field conditions.
3. Analyze field conditions (tillage, moisture) for planting.
4. Conduct soil residue measurement using line transect method.
5. *(Optional) Demonstrate understanding of crop production by tracking production practices on a field during the growing season.

Materials, audio-visual aids:

Three different soybean/corn maturity seeds
 Container(s) to plant seeds in
 Soil to fill those containers
 Popsicle sticks to label plants & sharpie
 50 ft tape measurer
 2 screw drivers (to anchor tape measure)
 Soil Thermometer
 Clipboards
 Pencils
 Ruler(s)

Location for lesson is best in an area where instruction can be held in addition to trips to a field.

Resources:

ISU Green & Growing (Level 2) Manual, Chapters 2 & 6
 ISU Seedy Business (Level 1) Manual, pgs. 28-29

Handouts

1. Things to Consider Worksheet
2. Two hybrid seed comparisons on traits (can find them on the Internet)
3. Example of a seed bag tag or Minnesota wheat label sheet
4. Estimating Residue: Line Transect Method, Missouri Fact Sheet

Solving the Problem

1. Interest Approach

Things to Consider Activity:
 -Car selection factors

2. Problem statement

What are factors should be considered when planting corn or soybeans?

3. **Objective 1:**

- 1.1 Hand out activity sheet, “things to consider”.

- 1.2 If you were going to pick out a car, what features would you look for?
- 1.3 Why did you select those factors?
- 1.4 Is cost a factor? Why/why not?
- 1.5 Would the car have to work for your needs? Schedule? Demands?

- 2.1 Today’s lesson, we’ll focus on factors that should be considered when planting?
- 2.2 What do you think are factors to consider? (Write them down on the back-side of your worksheet.)

- 3.1 Go over Factors worksheet discussing

<p>Examine selection criteria for planting hybrids.</p>	<p>factors that could affect yield. Define several important terms on the worksheet.</p> <p>3.2 Discuss maturity zones of soybeans and relative maturity of corn...</p> <ul style="list-style-type: none"> -Explain soybean maturity zones. (Maturity Zone 3 etc) (Relative Maturity for corn, 110 day, etc.) -What is most commonly planted around here? <p>-Complete <u>LABEL EXERCISE</u> on PAGE 33, ISU Crops level 2 manual, using a seed tag example or MN seed handout.</p> <p>-Ask youth why some of those factors matter?</p> <p><u>-PLANT SEEDS</u> into containers & label them by maturity dates... we'll be checking and comparing these seeds throughout the growing season.</p> <p>-If desired, have youth conduct tests (i.e. planting differences such as planting depth, compacted, etc.) comparing seedlings to optimum planting conditions. (Can use container experiment handouts to track this.)</p>
<p>4. Objectives 2 & 3: Determine factors that affect planting in different field conditions.</p> <p>Analyze field conditions (tillage, moisture) for planting.</p>	<p>4.1 Explain the probability of frost for the area and how that affects hybrid selection.</p> <p>4.2 How does moisture affect when to plant? Sidewall Compaction, etc.</p> <p>4.3 What should soil temperature be? What happens if soil is too cold?</p> <p>4.4 Conduct <u>SOIL TEMPERATURE TEST</u> with youth in the field. Have youth follow the procedure as given on pg. 28 & 29 of ISU, Crops level 1 manual.</p> <p>4.5 (If field is planted, have youth search for the seedling to determine planting depth and seed spacing.)</p>
<p>5. Objective 4: Conduct soil residue measurement using line transect method.</p>	<p>5.1 <u>CONDUCT RESIDUE TRANSECT</u> to determine percentage residue in the field.</p> <ul style="list-style-type: none"> -Can use Estimating Residue: Line Transect Method, Missouri Fact Sheet to explain procedure <p>5.2 Have youth work to measure out 50 feet of</p>

<p>6. Objective 6: *(Optional) Demonstrate understanding of crop production by tracking production practices on a field during the growing season.</p>	<p>row at 45 degree angle, anchor to ground with a tape measure. Count when residue hits directly under each 1 foot increment and then when done, record it on sheet.</p> <p>5.3 Multiply those raw numbers by 2; take the average the group found.</p> <p>5.4 How does the amount of residue in a field affect planting?</p> <p>6.3 Remind youth they can complete projects at the fair. -Grain samples -Posters -Etc.</p> <p>6.2 Hand out the crops kits and tell youth they can now keep track of the rainfall, GDD as in their ISU books (Level 2, pgs. 30-31)... We'll talk about that and share that later on.</p>
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Summary (Closure) – Conclusion to the Problem:

What are factors should be considered when planting corn or soybeans?

1. What criteria should be considered for planting corn and soybean hybrids?
2. What factors affect planting? What are desired field conditions to plant?
3. How do field conditions at planting time affect planting decisions? What can happen in different field conditions? Good and bad?
4. How do you conduct soil residue measurement using line transect method?
5. Define and understand the basics of on-farm research.

Performance Assessment:

Youth are encouraged to create a poster, small report, or report back to the group how to predict yield or factors that affect yield. (This can be entered at the fair.)

References:

Schwab, D. L., Levings, J., & Creswell, J. (2004). *Seedy Business, Manual One*. Iowa State University Extension.

Schwab, D. L., Levings, J., & Creswell, J. (2004). *Green and Growing, Manual Two*. Iowa State University Extension.

What do you want?

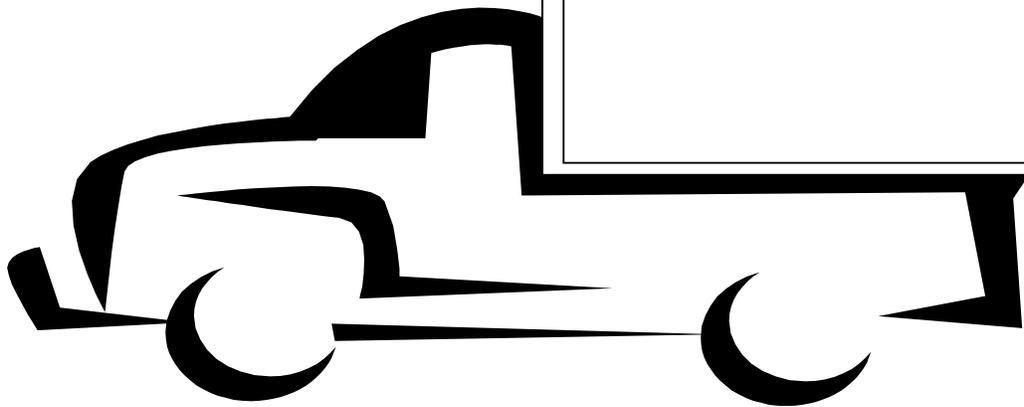
Factors to Consider

(To be used with pre-planting lesson)

If you could purchase a vehicle, what characteristics would you like that vehicle to have?



What are other important factors to consider when purchasing a vehicle?



What are some concerns you might have when purchasing that vehicle?



Where would you purchase that vehicle from?

Are there resources you can use to help you in selecting your vehicle?





Pre-Planting Factors

Crops have hybrids which allows you to select various characteristics desired which fit the best into one's management practices. Climate also plays a large role into determining the proper seed selection.

Corn Hybrid Selection

Several important factors to consider when selecting corn hybrids are:

_____ – the length of time it takes for corn to grow from the day it is planted until the kernels are mature (safe from frost)

_____ – difficult to predict due to factors such as the number of ears on a plant, the ear size, the number of kernel rows, length of the ear, or the kernel size

_____ – the ability of a plant to stand up on its own until harvest

Other factors to consider:

Germination rate & vigor, disease resistance, stress tolerance, insect resistance, herbicide resistance, how you plan to use the corn (selling it vs. feeding to livestock) and how reliable the dealer is whom you purchase the seed

Soybean Hybrid Selection

In addition to selecting a soybean variety that has high yield potential, is resistant to falling over or lodging, is good quality seed, and tolerates diseases and nematodes, there is another important factor to consider when selecting soybean seeds.

_____ – This is important since day length varies according to how far north of the equator a location is. A variety should not be planted much farther north or south for the region which it is intended.

_____ controls flowering and maturity of soybeans. (As day length is shorter, soybean plants start to mature and lose their leaves.)

Other than hybrids, what else should be considered when planting corn and/or soybeans?

- Planting date
- Seeding rate
- Soil temperature
- Planting depth, Planting time, Planting population
- Planter parts/drill parts
- Seed treatments

Probability of Frost for Fillmore County, NE:
 Each winter, on average, risk of frost is from October 11 through April 23.
 Almost certainly, however, we will receive frost from October 25 through April 8.
 We are almost guaranteed to not get frost from May 8 through September 27.
 Frost-free growing season is around 171 days.



Pre-Planting Factors

ANSWER KEY

Crops have hybrids which allows you to select various characteristics desired which fit the best into one's management practices. Climate also plays a large role into determining the proper seed selection.

Corn Hybrid Selection

Several important factors to consider when selecting corn hybrids are:

Maturity Time – the length of time it takes for corn to grow from the day it is planted until the kernels are mature (safe from frost)

Yield – difficult to predict due to factors such as the number of ears on a plant, the ear size, the number of kernel rows, length of the ear, or the kernel size

Standability – the ability of a plant to stand up on its own until harvest

Other factors to consider:

Germination rate & vigor, disease resistance, stress tolerance, insect resistance, herbicide resistance, how you plan to use the corn (selling it vs. feeding to livestock) and how reliable the dealer is whom you purchase the seed

Soybean Hybrid Selection

In addition to selecting a soybean variety that has high yield potential, is resistant to falling over or lodging, is good quality seed, and tolerates diseases and nematodes, there is another important factor to consider when selecting soybean seeds.

Soybean maturity zones – This is important since day length varies according to how far north of the equator a location is. A variety should not be planted much farther north or south for the region which it is intended.

Day length controls flowering and maturity of soybeans. (As day length is shorter, soybean plants start to mature and lose their leaves.)

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Corn Maturity Zone

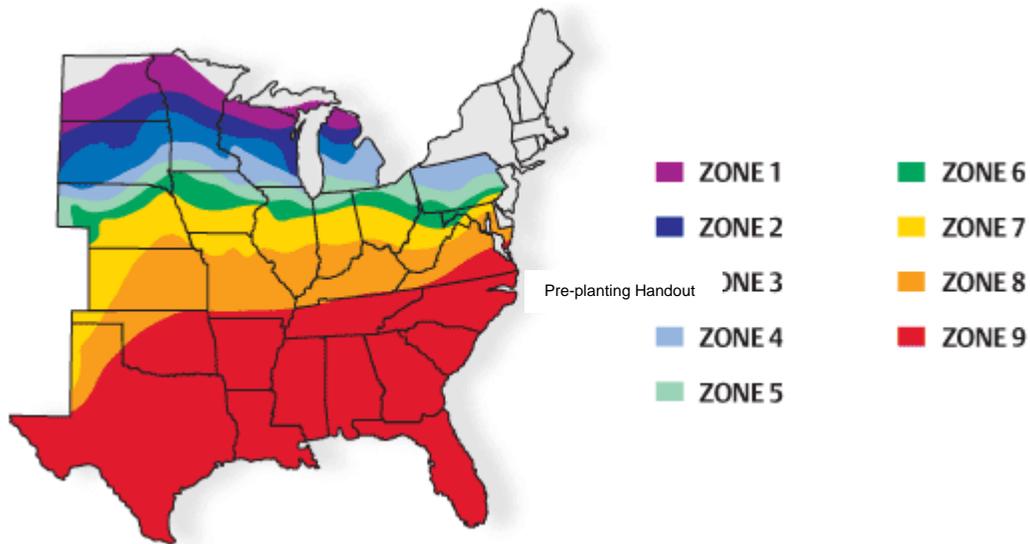
Full-season - Planted on the optimum planting date, these hybrids make full use of the available growing season*.

Mid-maturity - Planted on the optimum planting date, these hybrids reach maturity before the end of the growing season*.

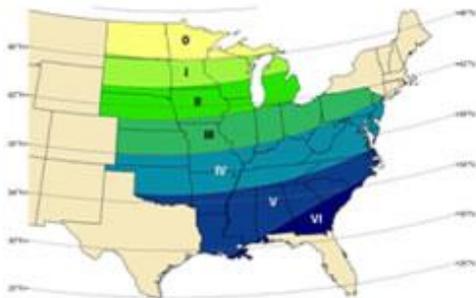
Early maturity - These hybrids are used only under late-plant or replant situations by most growers. *Assumes normal growing degree unit accumulation

Corn Maturity Zones Map

Planting the right corn for your specific climate is vital to maximizing the profitability of your farm. The chart below can be used as a reference when examining the corn hybrid descriptions in the Stine seed catalog. If you're unsure about which zone your farm is in or which corn hybrid is right for you, contact your Stine Representative, Stine Agronomist or Stine dealer.



Source: Stine Seeds



Source: National Soybean Research Laboratory, 2010

