**Instructions**

ANSWER KEY

Carefully read the article “Farm Machinery Selection” from the Iowa State University extension and outreach. This worksheet will help to review key vocabulary, check your understanding of the reading, and apply what you’ve learned with a math problems and critical thinking questions. Be sure to answer in complete sentences where applicable and show your work for any calculation.

**Part 1: Vocabulary**

Define the following terms based on the reading

1. Ownership Costs:

“Machinery ownership costs include charges for depreciation, interest on investment , property taxes, insurance, and machinery housing”

1. Operating Costs:

“Operating costs includes fuel, lubrications, and repairs.”

1. Timeliness Costs:

The costs associated with yield or quality losses when planting or harvesting is delayed

1. Field capacity:

The number of hours that a machine can cover in one hour, factoring in width, speed and field efficiency

1. Field Efficiency:

The percentage of the theoretical field capacity actually achieved, accounting for time lost to turning, overlapping, making adjustments and stopping.

1. Draft Requirement:

The pulling force required per unit of width to move an implement through the soil

**Part 2: Comprehension Questions**

Answer the following questions based on the reading

1. What is the main goal of a good machinery manager when selecting farm machinery?

To have a system of farm machinery that is flexible enough to adapt to a broad range of weather and crop conditions while minimizing long-run costs and production risks

1. What does figure 1 in the reading show about the relationship between machinery size and total machinery cost per acre?

That costs decrease initially as machinery size increases but eventually rise again after a certain point

1. How does crop diversification help reduce machinery capacity needs?

Crop diversification spreads out critical field operation periods, like planting and harvesting, reducing peak demand on machinery and labor

1. What are the risks associated with early planting?

The main risk associated with early planting is the potential need for replanting and possible frost damage, but the risks are usually outweighed by the benefits

1. What is a good rule of thumb for the number of field days needed to complete tillage and planning for most farms?

Aim to be able to complete tillage and planting in about 20 days

1. What three factors affect an implement’s field capacity?

Width, speed and field efficiency

**Part 3: Applied Math**

Use the formulas provided in the reading to solve the following problems*. Note: the values 8.25 and 375 are conversion factors. 8.25 converts feet x mph into acres per hour and 375 converts to horsepower*

1. You have two options for planting soybeans:
   1. A 15-foot no-till drill operating at 6 mph and 70% efficiency
   2. A 20-foot planter with attachments operating at 5.5 mph and 75% efficiency

Which machine has the higher field capacity? Show your work and circle your answer.

1. A 24-foot field cultivator operates at 7 mph on firm soil using a 4WD tractor. The disk requires a draft of 300 lb/ft. what is the required PTO horsepower? (use the soil factor for 4WD in firm soil = 1.52) show your work
2. You want to harvest 1400 acres of corn in 14 field days, working 10 hours per day. If your combine runs at 4.5 mph with a field efficiency of 80%, what is the minimum implement width you need? Show your work.