

Corn field math

How much corn can one acre grow?

Materials

- Corn Field Math student pages
- Graph paper
- Calculators

Teacher instructions

1. Review the unit background with your students and define vocabulary.
2. Discuss how corn is important to our economy and its many products that are produced and consumed.
3. Discuss who benefits the most financially, the producer (farmer) or industry?
4. Hand out the worksheet for students to complete.
 - Students will work in pairs to complete.
 - Students will check answers after completing the first 2 problems before continuing.
 - In a class discussion, students will agree or disagree with the reasoning of other classmates and defend their positions.

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How much corn can one acre grow?

Materials

- Graph paper
- Calculator (optional)

Instructions

1. Use your calculator to solve the following problems. Compare your methods with a partner.
 - An acre of land is 43,560 sq. ft., how long is one side of a square acre?

$$\sqrt{43,560 \text{ ft}} = 208.7 \text{ ft}$$

- If the rows are 2.5 ft. apart, how many rows are there?

$$208.7 \text{ ft} / 2.5 \text{ ft} = 83.5 \text{ rows}$$

- How many corn plants will be in each row if there are 35,000 plants in a square acre?

$$35,000 \text{ population} / 83 \text{ rows} = 421 \text{ plants/row}$$

2. Each corn plant produces one ear of corn. In a determinant ear, there is an average of 600 kernels per ear, in a flex ear, there could be 800 kernels per year depending on environmental conditions. How many kernels are produced on 1 acre of land for a determinant ear, for a flex ear?

$$\text{Determinant Ear: } 35,000 \text{ plants} \times 600 \text{ kernels/plant} = 21,000,000 \text{ kernels}$$

$$\text{Flex Ear: } 35,000 \text{ plants} \times 800 \text{ kernels/plant} = 28,000,000 \text{ kernels}$$

Wait: check your answers to the first two problems before continuing!

3. One acre of determinant ears can average 175 bushels per acre. How many kernels of corn are in a bushel?

$$21,000,000 \text{ kernels} / 175 \text{ bushels} = 120,000 \text{ kernels/bushel}$$

4. A farmer has 640 acres planted in corn. How many bushels of corn will this yield with determinant ears, with flex ears?

$$\text{Determinant ears: } 640 \text{ acres} \times 175 \text{ bushels/acre} = 112,000 \text{ bushels}$$

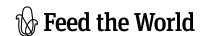
$$\text{Flex ears: } 28,000,000 \text{ kernels/acre} / 120,000 \text{ kernels/bushel} = 233 \text{ bu/acre}$$

$$640 \text{ acres} \times 233 \text{ bushels/acre} = 149,120 \text{ bushels}$$

5. Corn is selling for \$3.40 per bushel. Farmer A's plants produce determinant ears, while Farmer B's plants produce flex ears. Compare their earnings per acre.

$$\text{Farmer A: } 175 \text{ bushels/acre} \times \$3.40 \text{ per bushel} = \$595.00 \text{ per acre}$$

$$\text{Farmer B: } 233 \text{ bushels} \times \$3.40 \text{ per bushel} = \$792.20 \text{ per acre}$$



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6. The yield has increased by 145% or by a factor of 2.45 since 1950. It is 159 bushels today. What was it in 1950? Explain in writing how you completed your answer.

$$159 \text{ bushels} / 2.45 = 64.9 \text{ bushels}$$

7. The farmer decided to plant his 320 acres in two different varieties of corn. Use graph paper to construct a model of the farmer's land. Label each section, and complete the calculations. Show your work. Discuss your work on this question with a partner or in a cooperative group.
- Variety A produces 1 determinant ear per plant. The farmer planted $\frac{1}{3}$ of his 320 acres in Variety A. How many bushels of corn can he expect from Variety A?



$$106.7 \text{ acres} \times 175 \text{ bushels/acre} = 18,672.5 \text{ bushels}$$

- Variety B produces 1 flex ear per plant. The farmer planted $\frac{2}{3}$ of his 320 acres in Variety B. How many bushels of corn can he expect from Variety B?



$$213.4 \text{ acres} \times 233 \text{ bushels/acre} = 49,722.2 \text{ bushels}$$

- What is the total yield the farmer can expect for the entire 320 acres?

$$18,672.5 \text{ bushels} + 49,722.2 \text{ bushels} = 68,394.7 \text{ bushels}$$

- How much would the farmer receive from the sale of his corn at \$3.40 a bushel?

$$68,394.7 \text{ bushels} \times \$3.40/\text{bushel} = \$232,541.98$$

(revenue before expenses are accounted for)

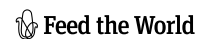
Reflection

1. How can a farmer make the greatest profit? Is this risky, why or why not?

The farmer can make the greatest profit by only planting flex ears. This is risky because the length of a flex ear is subject to good environmental conditions, if it is a poor year, the yield will decrease dramatically.

2. What could happen if the average bushels per acre increases to 200 bushels per acre in the future? How much of an increase is this?

If the average number of bushels per acre increases to 200 from 175, a 12.5% increase will occur. This can help to feed an ever growing population.



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