Increasing Production with Precision Agriculture Worksheet

Name _____

Activity 1

How does water use efficiency vary within the field?

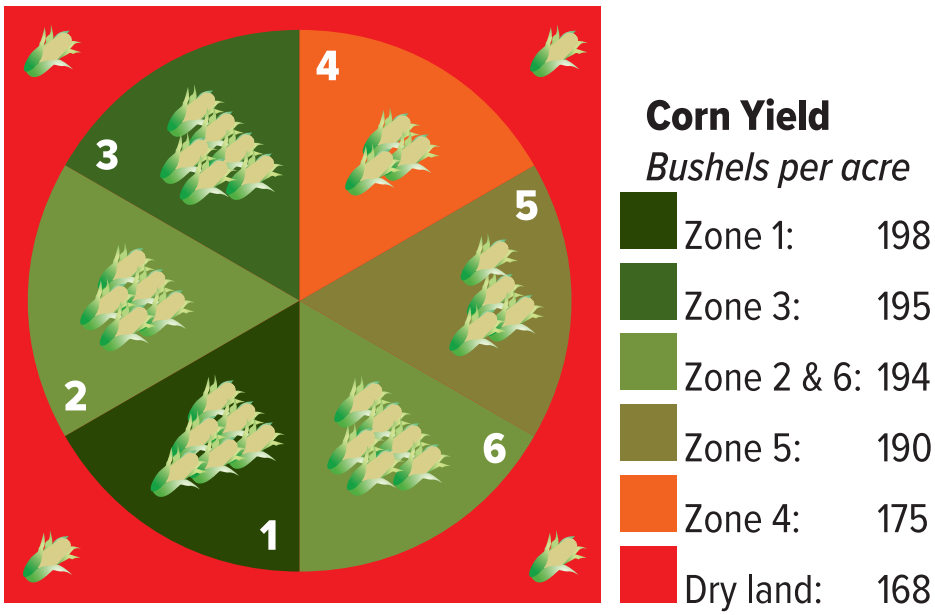
Yield data was collected during harvest. Sensors in the harvest equipment monitored the amount of corn harvested in each location of the field and recorded the data in a yield map. An average of the yield in each section was calculated to measure water use efficiency (WUE) in each section.

Overall field yield:

Irrigated yield: 190 bushels/acre
Dry land yield: 168 bushels/acre
Irrigation: 10 inches

$$WUE = \frac{\text{Irrigated Yield - Dry Land Yield}}{\text{Irrigation (in)}}$$

Calculate WUE for the zones of irrigation in the field



$$WUE = \frac{190\ \frac{\text{bushels}}{\text{acre}} - 168\ \frac{\text{bushels}}{\text{acre}}}{10\ \text{in}}$$

$$WUE = 2.20\ \frac{\text{bushels}}{\text{acre in}}$$

How can we construct a device to vary water flow using the engineering design process?

Problem and Objective

Example: Need to construct a device to vary water flow.

Brainstorming

Example: Differences in straw diameters will play a factor.

Constraints and Criteria

Example: Allowed to use only two materials (limited resources)

Testing

Example: Water flowed into amounts of 5 fluid ounces, 5 fluid ounces, 6 fluid ounces.

Potential Solutions

Example: Need to use different types of straws.

Final Solution

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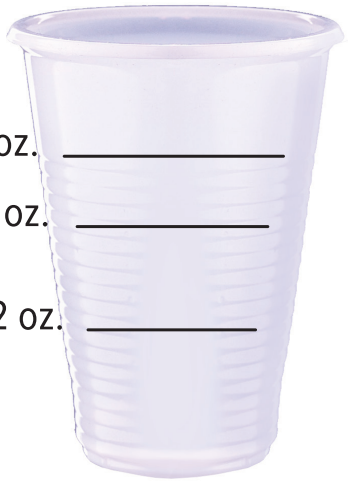
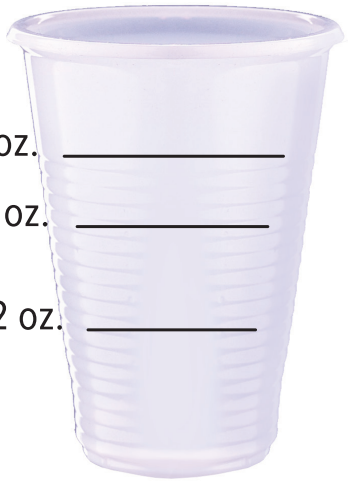
How accurate was your design? Record the amount of water that went into each cup.



8 oz. _____

6 oz. _____

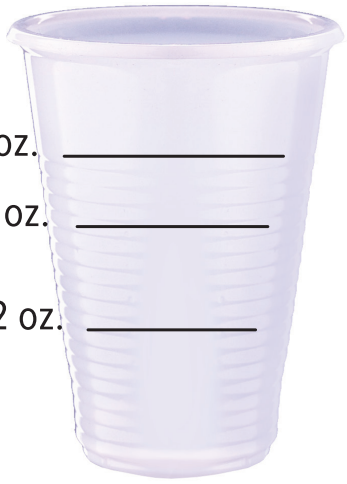
2 oz. _____



8 oz. _____

6 oz. _____

2 oz. _____



8 oz. _____

6 oz. _____

2 oz. _____

Was your design successful? _____

What could you do to improve your design? _____

Why do you think that varying water amounts is useful? _____

References

https://www.agclassroom.org/matrix/lesson/513/