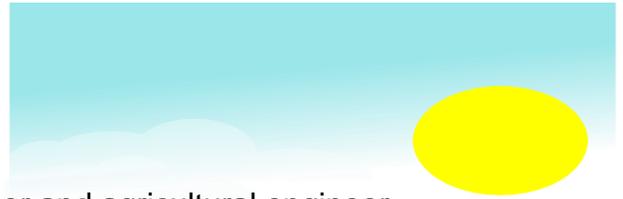


# BREAKOUT: DUST BOWL

## ENGINEERING CHALLENGE



For this challenge, you are going to take on the role of farmer and agricultural engineer.

The government has given you a tract of land to farm in the heart of the Southern Plains. You will need to plant enough crops to feed your family, but you also need to design a way to keep the topsoil from degrading and blowing away.

The area has experienced several years of above average rainfall, but forecasters are mixed in their predictions about the coming year.

**To make sure your farm can withstand the cycle of drought and rain, you will use dry, loose sand or soil and test how well your plot holds up to Oklahoma's winds.**



### HERE'S WHAT YOU'LL NEED:

Reuse the materials you have from the two field activity, but feel free to add any extra supplies you might have on hand.

- Pizza box
- Dry sand or soil
- Piece of soil erosion blanket
- Pipe cleaners/chenille stems

### WHAT TO DO:

The pizza box represents your plot of land.

As you think about potential designs, remember to plant enough crops to feed your family and pay your bills, but still protect your valuable topsoil from the effects of drought and wind.

How much of your farmland will hold crops?

Will you till your soil or find another method for planting?

How much of the area will you cover with other types of vegetation? What kind will you use?

How much of the soil will you leave bare?

**Use the square to layout your planting plan.**

**Planting Key:**

Once you have a plan, use pieces of pipe cleaner to represent your farm crops. Annual crops, by their nature have small shallow root systems. When you plant these areas, only push the pipe cleaners in about ½ inch into the “soil”.

You will need to adjust the depth of planting and root systems to match any non-crop vegetation you choose to use.

Once you’ve designed your farm, test it out to see how it handles the brisk Oklahoma wind.

Farmers gamble on the weather each year. Weather forecasts are helpful, but not always accurate. To see what type of weather patterns your plot of land received during the growing season, roll a dice.

If you roll a	You had this weather pattern during the growing season:
1 or 3	Above average rainfall. Mild winds spring and summer. Temperatures slightly below normal
2	Below average rainfall and moderate winds in the spring Above average temperatures and higher winds during the summer months.
4 or 5	Wet, cool spring. Hot, dry, windy summer.
6	Unseasonably warm and dry spring. Hot, windy, dry summer.

**How do you think your farm and, more importantly, your topsoil fared?**

**What changes would you make in your planting plan for next season?**