**Stage 3: Imagine**

**One sheet per group**

**Due May 29th**

1. Overview of your solution and why it will solve your problem?

For our solution, we are going to use CRISPR technology to gene-splice common African crops such as yams, corn, etc to be drought resistant. This will solve on the biggest issues facing sustainable agriculture in Africa, which are droughts and a lack of usable water. We will also create simple instructions on how to better grow these new, specialized, crops. The combination of these will give under educated and underfunded farmers the crops to produce large amounts of food, and the knowledge of how how to best utilize and care for them.

1. Detailed description of the solution

To start, we are going to partner with a genetics lab in order to do the initial gene splicing, hopefully the UC Davis Genetics Laboratory. Our goal is to make the crops drought resistant, and we are aiming to do this through the gene DREB1, which gives drought resistant plants this ability. We will extract this gene from the yarrow flower using a restriction enzyme. We will then insert the gene into the crop and mass produce the crop. We will make an instruction booklet to explain how to plant the crops most effectively, as farmer undereducation is a large barrier for food production. We will then partner with a charity or other organization in order to get our product all around Africa.

Planned Picto instructions

(This example is for corn)

1. Farmer with shovel
2. Man next to hole (depth marked by 2 tally marks)
3. Second hole next to original (distance marked by 5 tally marks)
4. Expanded row, new row above it (marked by 36)
5. Complete grid, 4\*6
6. Water Bucket, full. (bucket filling demotes large amount of water, medium, or little)

(This example is for soybeans)

1. Farmer with shovel
2. Man next to hole (depth marked by 2 tally marks
3. Second hole next to original (distance marked by 4 tally marks)
4. Expanded row, new row above it (distance marked by 24 tally marks)
5. Incomplete grid, arrow indicating extension
6. Water bucket, full. (Bucket filling denotes amount of water needed)
7. Your action plan: What needs to happen for you to be able to pitch your product
   1. Conduct tests to reach conclusions about our product
      1. Test how to code a restriction enzyme to take out gene from yarrow
      2. Test to find the best way to get gene into crops.
      3. Test to find to get gene into crop
      4. Test to find how to mass produce crop
   2. Find a way to make a physical product
   3. Make physical instructions
   4. Include detailed description of how the genetic crops are made
   5. Get criticism from peers.
   6. Create a final revised form of our product
   7. Create a pitch presentation
   8. Practice it
8. Email to virtual mentor

Hi Mr. Lobl,

My name is Wesley Fink and am a friend of your granddaughter Rachel Lobl. I am a high school student currently working on a project for STEM Biology and am in need of the input of an expert in science. I am reaching out to you as you are a professor of science. The issue we are trying to solve is famine and starvation in Africa. We have two solutions that we are currently considering and would love your input on them. Our first solution is using CRISPR technology to gene-splice common crops in these areas such as yams and maize to make them drought resistant. Our second solution is finding ways to make "clean meat" (the process of extracting animal cells to grow meat outside the animal and avoid killing it) more affordable and more widely available in Africa.Thank you for your time.